

# EFFECTS OF DISEASE SALIENCE ON SHAME, PRIDE, AND CONFORMITY

By

Ali Imran

Submitted to the graduate degree program in Psychology and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

---

Chairperson: Chris Crandall

---

Monica Biernat

---

Ludwin Molina

---

Yexin Jessica Li

---

Omri Gillath

Date Defended: September 28, 2015

The Dissertation Committee for Ali Imran  
certifies that this is the approved version of the following dissertation:

EFFECTS OF DISEASE SALIENCE ON SHAME, PRIDE, AND CONFORMITY

---

Chairperson: Chris Crandall

Date approved: February 24, 2016

## Abstract

Three studies investigated the effects of disease salience on conformity and the emotions of shame and pride. Humans possess a set of psychological adaptations to combat deleterious effects of parasitic disease (Schaller & Duncan, 2007). While these adaptations predictably lead to avoidance of strangers and out-groups, they also increase approach and conformity towards the in-group. I posit that heightened conformity pressure resulting from disease threat helps procure alliances and social support that is beneficial in offsetting the prospective cost of illness (Navarrete & Fessler, 2006). Shame and pride are hypothesized to provide reward-punishment contingencies to facilitate conformity to help one fulfill expectations of one's in-group. If disease threat increases conformity in individuals so they can secure social coalitions, the process should be driven by an increase in shame and a decrease in pride. I hypothesized that disease salience would (i) increase conformity, (ii) increase shame and decrease pride, and (iii) shame would increase whereas pride would decrease conformity. Three studies conducted on KU undergraduates tested these hypotheses using both correlational (Study 1) and experimental (Studies 2 and 3) designs. Study 1 ( $N=289$ ) found positive associations between indicators of chronic disease salience and those of conformity. Also, some of these associations were partially mediated by chronic levels of shame and pride. Study 2 ( $N=290$ ) manipulated disease salience by exposing participants to information about either the Flu (disease condition) or the white-tail deer (control condition) and recorded participants' approval of a proposed policy prescribing stricter measures against the issue of sexual assault on KU campus under three conditions of normative influence (pro-policy, anti-policy, and neutral). Disease salience did not increase conformity on average. Instead, it introduced resistance among participants with high commitment to feminist ideology in response to anti-policy influence. Participants with low

commitment to feminist ideology did not exhibit such resistance. Study 3 ( $N=248$ ) examined the effects of disease salience on approval of a proposed policy curtailing freedom of speech on KU campus under the same three conditions of normative influence as in Study 2. Disease salience (marginally) increased conformity to pro-policy influence among those who placed little value on Religiousness. Neither results of Study 2 nor 3, however, showed a mediation of these effects via shame or pride. Results of the three studies presented here suggest that disease threat may increase conformity to social influence when the influence is consistent with one's existing positions or those held by one's in-group. Disease threat can also cause opposition to social influence if it is against one's existing commitments or the views espoused by one's in-group. Findings of this research highlight the role of commitment to in-group ideology as a critical moderator of the conformity inducing effect of disease threat. These results also explain why disease-ridden societies espouse extreme ideologies and are more polarized along ideological lines.

*Keywords:* disease threat, conformity, pride, shame, sociality, social influence

## Acknowledgments

I have utmost gratitude for the following individuals who helped me during the course of this project: my advisor, Dr. Chris Crandall, who was always there with to offer his wisdom and support, my research assistants who worked tirelessly to collect data, and colleagues and faculty who offered their generous feedback on this research.

## Table of Contents

Chapter 1: Introduction .....	1
Parasitic Disease and Behavioral Immunity .....	2
Activation and Outcomes of the Behavioral Immune System.....	5
Interactionist Approach to Variations in Human Sociality.....	6
Effects of Disease Threat on Social Avoidance and Approach Tendencies .....	8
Disease Threat, Conformity, and the Role of Shame and Pride .....	15
Chapter 2: Study 1 .....	20
Method .....	20
Participants.....	20
Materials and procedure.....	20
Results.....	22
Discussion .....	24
Chapter 3: Study 2 .....	28
Method .....	28
Participants.....	28
Design. ....	28
Results.....	32
Discussion .....	35
Chapter 4: Study 3 .....	37
Method .....	37
Participants.....	37
Design. ....	37

Results.....	40
Discussion.....	42
Chapter 5: General Discussion.....	44
Limitations and Future Directions .....	51
Chapter 6: Conclusion.....	53
References.....	54
Tables .....	66
Figures.....	77
Appendix A: Supplementary Tables and Figures.....	86
Appendix B: Materials Used in Study 1 .....	97
Appendix C: Materials Used in Study 2 .....	108
Appendix D: Materials Used in Study 3 .....	118

## List of Tables

Table 1: Correlation Analysis in Study 1 .....	66
Table 2: Regression Analysis in Study 1 .....	67
Table 3: Multiple Mediation Analysis-1 in Study 1 .....	68
Table 4: Multiple Mediation Analysis-2 in Study 1 .....	69
Table 6: Means and Standard Deviations of Moderator & Mediators in Study 2 .....	71
Table 7: Correlations in Study 2 .....	72
Table 8: Results of GLM Analysis in Study 2 .....	73
Table 9: Correlation Analysis in Study 3.....	74
Table 10: Means and Standard Deviations of Approval in Study 3 .....	75
Table 11: Results of GLM in Study 3 .....	76



## List of Figures

Figure 1. Theoretical model depicting the dual effects of disease threat on sociality. ....	78
Figure 2. Model Depicting the Expected Effects of Interaction between Disease Salience and Existing Attitudes on Shame, Pride, and conformity in Studies 2 & 3.....	79
Figure 3. Multiple mediation model predicting scores on Conformity Scale from indicators of Chronic Disease Salience (n=239).....	80
Figure 4. Multiple mediation model predicting Scores on Conformity Values from indicators of Chronic Disease Salience in Study 1 (n=239). ....	81
Figure 5. Expected Patterns of the Estimated Marginal Means of Approval of Proposed Policy at 3 levels of Influence and 2 Conditions of Disease Salience in Studies 2 & 3. ....	82
Figure 6. Estimated Marginal Means of Approval of sexual assault policy at 3 levels of Influence and 2 Conditions of Disease Salience (n = 242). ....	83
Figure 7. Effects of Disease-salience and Influence on the Approval of sexual assault policy at three levels of Feminist Ideology (n = 242). ....	84
Figure 8. Estimated Marginal Means of Approval of Social Media Policy at 3 levels of Influence and 2 Conditions of Disease Salience (n = 215). ....	85
Figure 9. Effects of Disease-salience and Influence on the Approval of Social Media Policy at different levels of valuing Religiousness (n = 215). ....	86

## Chapter 1: Introduction

Infectious diseases pose a serious threat to human populations (Wolfe, Dunavan, & Diamond, 2007). Parasitic infections have brought innumerable atrocities to human lives. The 14<sup>th</sup> century Plague outbreak claimed approximately 20 million Europeans (Haensch et al. 2010). The Spanish Influenza infected a third of the world population and killed over 50 million people between 1918 and 1919 (Taubenberger & Morens, 2006). Over and above millions being killed, the survivors of such epidemics face long-term set-backs to their physical, social, and reproductive well-beings. Epidemics do not only harm individuals; they also seriously limit the sustainability of entire communities.

Parasitic disease is one of the basic adaptive problems that all beings had to solve in order to survive and reproduce. Parasitic infections cause harms to the normal functioning, survival, and reproduction of organisms, including humans (Van Blerkom, 2003). Parasites carry the potential to seriously damage host populations in the service of the parasites' own nourishment and growth. Due to this threatening nature of parasites, organisms develop the tools necessary to both *fight* and *avoid* infectious disease (Ebert & Hamilton, 1996; Hillis, 1990). While our bodies were adapting to fight the pressures exerted by disease (i.e., evolution of the immune system), a parallel evolution of mind and behavior selected and adapted psychological mechanisms—also known as the behavioral immune system (BIS: Schaller, 2006)—that complement our bodies' efforts in the battle against infectious disease by avoiding potential disease carriers.

When activated by disease threat (i.e., actual or perceived presence of pathogens in the environment), the BIS also affects the nature of human social interactions. The parasite-stress theories of human sociality (Fincher & Thornhill, 2012b; Thornhill, Fincher, & Aran, 2009; Thornhill, Fincher, Murray, & Schaller, 2010) posit that (actual or perceived) disease threat has

dual effects on the way people feel and act towards others. These dual effects include (i) avoidance (e.g., stigmatization and social exclusion) of the potentially pathogen carrying strangers and negativity towards out-groups (for reviews, see Kurzban & Leary, 2001; Schaller, Park, & Faulkner, 2003), and (ii) approach towards the in-group and stronger conformity to group norms (e.g., Neuberg, Kenrick, & Schaller, 2011; Thornhill et al., 2010). While existing work presents a detailed picture of the avoidance tendencies caused by disease threat, it lacks at explaining how and why disease threat increases conformity.

I posit that two distinct parallel processes cause xenophobia and conformity, one (disease-avoidance) of which serves to avoid disease, whereas the other (cost-management) helps procure resources crucial in managing the potential cost of sickness respectively (see Figure 1). In this research, I focus on the effects of disease threat on conformity, the emotions of shame and pride, and the potential intermediary role of shame and pride in the link between disease threat and conformity.

### **Parasitic Disease and Behavioral Immunity**

Parasites (or pathogens) are organisms that live in or on a host organism at the cost of the host's resources and health (Price, 1977). The costs accrued by parasitic disease can threaten the hosts' fitness. To counteract these threats, hosts evolve defenses which may, in turn, be counteracted by the parasite species via the development of new attack mechanisms, potentially culminating into host-parasite co-evolution (May & Anderson, 1990; Price, 1980).

Over the short history (ca. 150,000 years) as a species, homo-sapiens have dealt with a large variety of parasites. Currently, some 437 parasites species of are known to exist worldwide that can affect humans (Ashford & Crewe, 2003). Infectious disease exerted one of the major selection pressures that resulted in evolution of specialized adaptive mechanism in the human

species (Motulsky, 1960). Adaptations at the disposal of a human “acquired by earlier natural selection, such as the nimbleness of mind and agility of body necessary to outfight predators . . . failed to protect him against infectious-disease” (Motulsky, 1960, p. 30). Later adaptations that include biological and behavioral immune systems evolved to survive the risks posed by parasitic disease.

The biological (or classical) immune system (IS) is a set of coordinated biological structures and processes that function within an organism to fight and avoid disease. Pathogens can threaten any organism’s health and well-being. Therefore, nearly all organisms with a membrane bound nucleus carry some level of immunity against pathogens and harmful foreign agents (Paustian & Roberts, 2012). However, some ISs are equipped with more sophisticated weapons, such as specific and nonspecific killer cells, whereas some have more layers than others, including physical barriers (e.g. the skin) and behavioral strategies, and thus, are better adapted to fighting disease (Mayer, 2006). Different IS layers provide different levels of protection against pathogens with differing levels of costs to the organism. Generally speaking, the deeper the level of infection, the higher the metabolic cost of the immune response. Therefore, preventive immune responses are more adaptive than reactive immune responses.

The Behavioral Immune System (BIS) is a complementary preventive system that aids the Immune System (IS) in fighting disease (Schaller, 2006). The BIS is a set of coordinated psychological mechanisms that serve as an additional layer of protection against disease threat. A BIS response consists of detecting the contaminated entity, which motivates the organism to avoid it (Schaller & Duncan, 2007). A biological immune response to infection may be costly in terms of physiological resources. BIS is argued to have evolved as a preventative adaptation to avoid disease before it could make contact with the body (Schaller & Park, 2011). Several other

animal species besides humans (e.g., mice, bullfrogs, lobsters) have been found to exhibit behavioral immune responses (i.e., detection and avoidance of diseased entities) in the face of parasite threat (Behringer, Butler, & Shields, 2006; Kavaliers, Choleris, & Pfaff, 2005; Kavaliers & Colwell, 1995; Kiesecker, Skelly, Beard, & Preisser, 1999). The preventative function of the BIS enhances an organism's chances of survival. This function ensures that an organism lives till the age of reproduction and, thus, has adaptive advantages for the organism.

Despite its parsimony in spending physiological resources, a behavioral immune response can cause one to lose out on some social and environmental opportunities. As a species, humans rely fundamentally on social alliances. Given the lack of physical strength and martial features (claws, strong jaws, horns, etc.), several of our basic adaptive goals (e.g., acquisition of food, mates, shelter from natural calamities) pertaining to survival and reproduction are contingent upon co-operation with other humans (Kenrick, Griskevicius, Neuberg, & Schaller, 2010; Kenrick, Neuberg, Griskevicius, Becker, & Schaller, 2010). A BIS response, triggered by the motivation to avoid infection, may lead one to avoid objects (e.g., potential sources of food) and conspecifics (i.e., potential allies) in the environment (Kurzban & Leary, 2001), which may result in partial to complete failure in achieving one's goals (e.g., acquisition of food and mates). Thus, BIS replaces the pure metabolic costs (e.g., production and release of killer cells, enzymes, and lymphocytes) accrued by the IS, with costs that are more social in nature. These costs, in turn, may hinder the accomplishment of one's adaptive goals by affecting how one act towards potential allies in one's environment. Consequently, studying disease threat and the resulting BIS activity can help us understand the modern day problems related to human sociality (Kurzban & Leary, 2001).

## **Activation and Outcomes of the Behavioral Immune System**

The BIS is activated by sensory inputs (i.e. auditory, visual or olfactory) signifying potential pathogen carriers (Schaller, 2011). However, direct sensory information is not necessary to trigger this process. BIS can also be set in motion via thoughts of contamination (i.e., cognitions; see Murray & Schaller, 2012). Similarly, recent history of infection may also give rise to a behavioral immune response via heightened attention to cues indicating threat of disease (e.g., Miller & Maner, 2011). These pathways differ in terms of their triggers and the intermediary processes that activate and drive the BIS. However, they all lead to the same behavioral outcome: the avoidance of potentially contaminated entities.

Activation of the BIS induces avoidance of the potentially infected entity by eliciting adaptive emotional (e.g., feelings of disgust), cognitive (e.g., thoughts of sickness and related symptoms), and behavioral reactions (e.g. avoidance of the potentially threatening entity; Schaller & Duncan, 2007; Terrizzi Jr., Shook, & McDaniel, 2012). A sizeable body of research supports this prediction. Physical cues—resembling those of illness—cause stigmatization and social exclusion of those bearing said cues (Kurzban & Leary, 2001), whereas disease salience increases both attention to those cues (Ackerman et al., 2009) as well as more negative attitudes towards stigmatized individuals (Park, Schaller, & Crandall, 2007). Similarly, increased vulnerability to infections can lead people to exhibit higher levels of xenophobia (Faulkner, Schaller, Park, & Duncan., 2004; Navarrete et al., 2007; Phelan, Link, & Dovidio, 2008).

In addition to affecting the perceptual and cognitive processes, disease threat also leads to emotional responses that help an individual build up behavioral immunity. These responses involve aversive emotional states, such as disgust (Rozin & Fallon, 1987). Disgust has been identified as one of the basic human emotions (Darwin, 1972) and is observed across cultures.

Disgust evolved to prevent contact with unhygienic and potentially contaminating objects (Rozin & Fallon, 1987). Entities infested with parasitic infection are one example of such unhygienic and contaminating objects, against which disgust serves as a protection. In other words, “disgust emotion polices the vulnerable portals of the body, defending them from the ingress of pathogens and parasites.” (Curtis & Biran, 2001, p. 29). Empirical findings have established a causal link between disgust and social prophylaxis (e.g., Navarrete and Fessler, 2006). In the cases of both stigma and prejudice, the emotion of disgust motivates the avoidance of out-groups and outcasts when risk of disease is high (Curtis, Aunger, & Rabie, 2004; Fessler et al., 2005; Fleischman & Fessler, 2011; Navarrete et al., 2007). Such findings suggest that disgust is one of the evolved mechanisms that comprise the BIS, which provides an individual with the drive to avoid contaminated objects culminating into a prophylactic response.

### **Interactionist Approach to Variations in Human Sociality**

Current research is based on the notion that disease threat impacts human sociality. Sociality refers to one's tendency to form cooperative social relationships. Two major theoretical approaches provide explanatory frameworks for understanding variations in human behavior in general, and social behavior in specific: the cross-cultural and the interactionist approaches.

A sizeable body of literature within cross cultural psychology has addressed the question of how individual traits, cognitions, and behaviors are shaped in a given society. According to this approach, social values, structures, and institutions are arbitrarily constructed across populations via group processes (Tooby & Cosmides, 1995; Triandis, 1999; Triandis & Brislin, 1984) and exist in the social world relatively independent of the individual's psychological makeup (Buss, 2001; Tooby & Cosmides, 1995). This approach assumes that individuals' psychological characteristics vary from one society to another because they were socialized in

different cultural environments. Theories and research that fall under this category classify societies in terms of individualism/collectivism (Triandis, 1990), horizontality/verticality (Triandis & Gelfand, 1998), 1998), looseness/tightness (Gelfand, Nishii, & Raver, 2006) or value orientation (Schwartz, 2006). While, these accounts adequately describe the psychological differences between people belonging to different societies, they do not address how the cultural environments that lead to these differences come into existence in the first place. Interactionist approaches attempt to answer that question.

Interactionist approaches to human psychology take into account both the individual's evolved motives and the ecological circumstances pertaining to those motives. Culture-wide behavioral outcomes may be explained in terms of gene-ecology interaction. Humans are equipped with biologically-based psychological adaptations that specialize in dealing with specific situations and problems in the physical and the social worlds (Gangestad, Haselton, & Buss, 2006). These adaptations are responsible for assessing the situation at hand and producing a response that is helpful in solving the particular adaptive problem. In other words, upon receiving specific inputs, psychological mechanisms elicit behaviors that have historically proven to be adaptive (Clay, Terrizzi Jr, & Shook, 2012). This sensitivity of psychological adaptations to environmental circumstances gives rise to variations in thought and action tendencies both in the long and the short run. Cognitive, affective, and behavioral commonalities between members of a society arising from this process are called evoked culture.

Interaction between ecology and psychological adaptations can cause variations in out-group avoidance and in-group approach tendencies. Boyer and Petersen (2012) have argued that cultural similarities observed between different societies exist due to evolved cognitive mechanisms. These prewired cognitive tendencies manifest in the form of development of



similar solutions to similar problems regardless of locale. For example, Schaller et al. (2003) have shown communities coping with threat of physical harm tend to have a heightened fear of and prejudice towards out-group members (also see Altemeyer, 1988). Similarly, disease threat leads to cultural variations in specific socio-cultural characteristics, such as use of spices (Murray & Schaller, 2010), xenophobia (Faulkner, Schaller, Park, & Duncan, 2004), and collectivism (Fincher, Thornhill, Murray, & Schaller, 2008) that may (directly or indirectly) help cope with said threat. Thus, the interactionist approach predicts that communities living in similar environments may possess similar socio-cultural traits due to shared levels of ecological challenges, e.g., disease threat. This suggests that the interplay between disease threat and evolved mechanisms pertaining to disease may be partly responsible for evoking the social tendencies that are of interest to this research.

### **Effects of Disease Threat on Social Avoidance and Approach Tendencies**

Avoidance and approach are two motivational systems that lead to essentially opposite outcomes. Approach and avoidance motivations refer to the energization and direction of behavior towards and away from positively and negatively evaluated stimuli, respectively (Elliot, 2006). The interaction of parasite stress and disease-relevant mechanisms gives rise to two distinct sets of phenomena. These sets are marked by avoidance of potentially diseased entities and the out-groups, and approach and adherence to familiar others and the in-group respectively. Given the opposing nature of avoidance and approach motivations, it is interesting to see how a single stimulus (i.e., parasite threat) simultaneously evokes both those tendencies in a given individual.

Disease threat leads to social avoidance and out-group negativity. This effect can be explained by the historic utility of excluding infected individuals from the society.

Communication of parasites from one individual to the other is a serious problem that arises with living in cooperative groups (Alexander, 1974). Avoiding infected individuals would have been an effective way of dealing with this problem in the ancestral environment (Kurzban & Leary, 2001). Indeed, humans tend to exclude community members based on markers of disease, e.g., morphological deviations from the population norms (Crandall & Moriarty, 1995). Further, the criteria used for exclusion of others may be overly-inclusive (Miller & Maner, 2012; Schaller & Park, 2011) causing false alarms in the detection of harmful entities. Consequently, when threatened by infection, an individual may show a general tendency to avoid other individuals irrespective of whether they actually carry a pathogen. This tendency to exclude certain individuals or groups from one's social purview gives rise to several distinct social phenomena, e.g., prejudice towards out-groups, stigmatization of deviant individuals, and selectivity in social and sexual choices.

Second, disease threat causes approach and positivity towards the in-group. This positivity manifests as a preference for and a tendency to conform to the prevailing norms and authorities of the in-group. For example, collectivism is associated with high disease prevalence (Fincher et al., 2008), while high levels of chronic disease salience are associated with vertical-collectivistic values (Clay et al., 2012). Disease prevalence is also associated with Authoritarianism (Murray, Schaller, & Suedfeld, 2013) and levels of tightness across societies (Gelfand et al., 2011). Experimentally induced disease threat makes people show stronger preference for conformity and obedience (Murray & Schaller, 2012) as well as behavioral conformity to majority influence (Murray & Schaller, 2012; Wu & Chang, 2012). These findings elaborate how disease threat can shape values, social interactions, and structures within societies

by inducing a preference for the group over the individual, stronger hierarchies, stricter rules and standards for appropriate behavior, and stronger adherence to those rules.

Even though in-group positivity effects of disease threat have been studied via empirical research, the theoretical underpinnings of these effects are obscured and unsatisfactory. Schaller and colleagues posited the existing model of disease threat effects on conformity, which suggests that adherence to group norms is increased by disease threat because existing norms provide a defense against risk of disease (Park & Schaller, 2009). Disease threat causes a general tendency to conform to all norms regardless of whether those norms serve a prophylactic function (Murray & Schaller, 2012). Consequently, conformity to group norms regarding hygiene and sanitation also increases. Since these norms came about through cultural evolution to fight local parasites, general conformity may be functional in avoiding the deleterious effects of parasites. Thus, according to this view, in-group positivity and conformity are part of the BIS and serve to satisfy the disease avoidance motive.

There are two problems with Schaller's et al. account. The first problem with Schaller's et al. view lies in the mismatch between the levels of specificity of the problem and the proposed solution. Cosmides and Tooby (1994) argued that a mechanism has to be domain specific in order for it to have evolved to solve an adaptive problem. Disease threat is a specific problem that could be solved by avoiding contaminated entities and potential disease carriers, which would, in turn, lead to stricter standards of sanitation and hygiene. General conformity provides very little prophylactic utility over and above the protection afforded by avoidance of contaminated entities. Secondly, general conformity doesn't necessarily lead to better practices in sanitation and hygiene. Poor hygiene norms tend to be a significant cause of infections in disease-ridden communities across the world (Bartram & Cairncross, 2010; Prüss, Kay, Fewtrell, & Bartram,

2002). A general increase in conformity will cause stricter adherence to poor practices of hygiene, which will cause more disease. Therefore, it is reasonable to suspect that conformity in response to disease threat may not have evolved to help avoid disease. Below I consider an alternative view that offers a better explanation of conformity-enhancing effect of disease threat. Navarrete and Fessler (2006) posit that increased positivity toward in-group can help one procure social resources necessary to undo the potential deleterious effects of sickness. Illness can affect one's well-being by negatively affecting their physiological, social and occupational functioning. When threatened with infectious disease, people become more conforming and ethnocentric to rehash their affiliation with the in-group. This effort helps one seek and develop in-group support networks that may be crucial in managing adaptive costs accrued by disease (Fincher & Thornhill, 2012a). According to this account, positivity and conformity to in-group do not serve a disease avoidance function. Instead, this view purports a cost-management function of in-group positivity in response to disease threat. This model offers a better explanation of conformity-enhancing effect of disease salience highlighting its place within the larger category of adaptive problems known to evoke such effects.

### **Effects of Disease Threat on Conformity**

Conformity is “the act of changing one's behavior to match the responses of others” (Cialdini & Goldstein, 2004, p. 606). Norms refer to standards of behavior that come about as a consequence of interaction between individuals (e.g., Sherif, 1936). Conformity to group norms serves both the individual and the group in fulfilling their respective needs. For the individual, conformity serves as a tool to seek alliances and assistance from other group members in the fulfillment of both his/her own biological and psychological needs (Baumeister, DeWall, Ciarocco, & Twenge, 2005). Those who conform to group standards are held in higher esteem by

others and are preferred as cooperative partners (Hardy & Van Vugt, 2006). In exchange, individuals' tendency to adhere to social norms helps maintain the internal structure and organization of a group, and thus, enables cooperation against outside threats to the group (e.g., Gelfand et al., 2011; Sherif, 1966). Failure to conform to group norms results in rejection and social isolation (Festinger, Gerard, Hymovitch, Kelley, & Raven, 1952) and, hence, prevents the fulfillment of individual's needs and motives.

Several motives have been proposed to give rise to conformist tendencies. In his groundbreaking work on conformity, Asch (1956) showed that people conform to an ostensibly incorrect majority response to avoid disapproval of the group. Cialdini and Goldstein (2004) found that three goals—namely accuracy, affiliation via social approval, and maintaining a positive self-concept—increased conformity to social norms (also see Pool & Schwegler, 2007 for a similar account). Accuracy and affiliation goals are achieved by following descriptive and injunctive norms respectively (Jacobson, Mortensen, & Cialdini, 2011). When hindered, affiliation goals (e.g., under threat of social exclusion) cause automatic conforming of one's behavior to others' (Lakin, Jefferis, Cheng, & Chartrand, 2003; Lakin & Chartrand, 2003; Lakin, Chartrand, & Arkin, 2008).

Majority influence can also sometimes evoke resistance instead of conformity. Two factors are critical in causing resistance to majority influence including strength of existing attitudes (Fuegen & Brehm, 2004), and certainty in one's judgment (Kelley & Lamb, 1957). Aramovich, Lytle, and Skitka (2012) showed that individuals with strong attitude against torture resisted majority influence to endorse torturing of terrorist both publically and privately. Strong moral convictions led people to both socially and physically distance themselves from dissimilar others and fostered discord in attitudinally heterogeneous groups (Stitka, Bauman, & Sargis,

2005). Further, participants resisted majority influence on a sensory judgment task when they had confidence in their own sensory experience (Kelley & Lamb, 1957). Finally, participants showed more resistance to a strong persuasion attempt when the target attitude was personally relevant to them vs. when it was not (Fuegen & Brehm's, 2004). Such findings are in line with *emotional intensity theory* (Brehm, 1999), which posits that an attempt to change an attitude or a behavior meets an amount of resistance proportional to the importance of a goal (i.e., strength of the fundamental values represented by the target attitude or behavior) and the deterrence to achieving that goal (e.g., maintaining an attitude or exhibiting a behavior). Thus, for any attempt of social influence, strength of the attitudes and values relevant to the target behavior can induce resistance to influence.

Since the human tendency to conform to group norms benefits both the group and the individual, a physical or a psychological challenge posed to either of those entities should enhance conformity among the members of a group. An extensive body of research shows that conformity serves as a goal attainment strategy when an individual's basic needs are threatened. These needs include self-protection and mate acquisition (Griskevicius, Goldstein, Mortensen, Cialdini, & Kenrick, 2006), social identity (Jetten, Postmes, & McAuliffe, 2002), esteem and existential security (Burke, Martens, & Faucher, 2010; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004), and coalition formation (Navarrete, Kurzban, Fessler, & Kirkpatrick, 2004; Navarrete & Fessler, 2005). Further, groups that consistently operate under conditions of threat (e.g., war) should develop stricter standards of conformity. Findings confirm that group level hazards such as ecological threats and intergroup conflicts increase the strength of social norms and the standards of conformity to said norms (Gelfand et al., 2011). This increase in conformist

tendencies facilitates alliances and coordinated action between group members to avert and fight adversity from external sources.

Pathogen threat should increase the tendency to conform to group norms because of its deleterious impacts on both the individuals' and the group's health. Much like other individual and group threats, disease pressures should increase conformist tendencies in order to protect both the individual and the group. Past research confirms that disease threat is associated with stronger conformity both at the cultural and the individual level. Cross cultural studies reveal regions with high prevalence of pathogens are marked with higher levels of collectivism (Murray & Schaller, 2010), which is known to be associated with high levels of conformity (Bond & Smith, 1996). Disease prevalence also increases behavioral conformity and value for obedience in a society (Murray, Trudeau, & Schaller, 2011), and decreases tolerance for non-conformity (Gelfand et al., 2011). Finally, conformist attitudes and behaviors are enhanced when disease is made salient (Murray & Schaller, 2012; Wu & Chang, 2012). Together, these findings show pro-normative influence of parasitic disease. This heightened conformity to the group standards reflects an approach tendency towards the in-group that helps an individual fulfill his/her affiliation needs.

Disease threat may also lead to socially restrictive attitudes and values that strengthen the barriers between the in-group and the out-groups. Social conservatism refers to a "socio-cultural value system that encourages strict adherence to social norms and emphasizes social exclusivity" and includes values such as authoritarianism, collectivism, religiousness, and political conservatism. (Terrizzi Jr et al., 2012, p. 100). Evidence suggests that conservative social attitudes and values such as collectivism, restrictions on civil rights (Murray & Schaller, 2010), authoritarianism (Murray et al., 2013) increase, whereas liberal values like democratization,

social liberalization (Thornhill et al., 2009), gender equality, and individualism (Thornhill et al., 2010) decrease with high disease prevalence. While avoiding out-groups under disease threat is beneficial to the individual, giving up rights and liberties can incur serious costs. However, disease threat has such strong effect on people's social outlooks that they forego liberties in exchange for the opportunity to belong to the group. This can only be functional if the benefits of group affiliation outweigh the costs of the foregone rights. I argue that giving up personal freedoms helps individuals develop a stronger bond with the in-group, which, in turn, can translate into social support in the event of physical ailment.

### **Disease Threat, Conformity, and the Role of Shame and Pride**

Humans seek alliances and coalitions (ranging from close friendships and family ties to symbolic relationships between unfamiliar group members) with other humans to meet their adaptive goals. Affiliation seeking is a basic human tendency (e.g., Baumeister & Leary, 1995; Buss, 1990) that evolved to solve a broad category of adaptive problems by acquiring social support of one's group members (Navarrete & Fessler, 2005). Aligning one's beliefs, attitudes, and actions with those of one's group can help obtain support from the group. Threat of disease is one such adaptive problem (Navarrete & Fessler, 2006) that motivates the quest for coalitions and social support.

Support arising from social coalitions can be crucial in one's battle against sickness. State of illness interferes with normal functioning of the human body, hence, rendering the individual vulnerable. Support from trusted others can help reduce the potential costs incurred due to said vulnerability. Due to this support eliciting role, one can reasonably conjecture that conformity pressure caused by disease threat is related to "management of infectious disease" (Fincher et al. 2008, p. 2). Thus, besides avoidance towards potential pathogen carriers, disease threat also



gives rise to approach towards potential agents of support (i.e., the in-group) that manifests as conforming one's thoughts, feelings, and behaviors to those of the group. Social support so acquired may prove invaluable in helping the individual manage and cope with potential costs of physical illness.

If disease threat leads to two distinct motivated processes, these processes should be underpinned by distinct motivating forces. Disgust is the motivating force that drives avoidance related outcomes of disease threat (e.g., Curtis, Aunger, & Rabie, 2004; Fessler et al., 2005; Fleischman & Fessler, 2011; Navarrete et al., 2007). What motivates the increase in conformity resulting from disease pressures is so far unknown. I propose that conformist tendencies resulting from disease threat should be driven by emotions of shame and pride that are known to promote conformity (Scheff, 1988; Fessler, 2004)<sup>1</sup>.

Shame is a social emotion that is experienced upon failure to conform to normative demands (Scheff & Retzinger, 2001; Harris, 2007; Fessler, 2004). Shame evolved to facilitate cooperation between conspecifics by enhancing “conformity to cultural standards for behavior that form[s] the basis for much cooperation” (Fessler, 2007, p. 174). Deviance from social norms results in social devaluation, social rejection, and the experience of shame. When ashamed, people tend to exhibit negative self-evaluations and a desire to withdraw from the shame-eliciting situation (Lewis, Alessandri, & Sullivan, 1992), as well as intentions to make amends (Tangney, Miller, Flicker, & Barlow, 1996). Further, people experience more shame when the social stakes are high (i.e., when a relationship is of high significance and the alternatives are

---

<sup>1</sup> Both shame and pride here refer to emotions experienced in regards to oneself, not to a group.

limited; Sznycer et al., 2012). Thus, shame punishes deviance and provides an individual with the motivation to seek social acceptance by striving to live up to social standards and norms.

Pride serves the same function by doing the exact opposite of shame. It is a discrete self-conscious emotion (Tracy & Robins, 2004a) that evolved to indicate an individual's status and acceptance in a society (Tracy & Robins, 2007a). Conformity to social norms leads to social acceptance and improved status in the group, which, in turn results in higher pride. Increased pride reinforces conformity by internally rewarding one upon one's successful fulfillment of socio-cultural expectations (Scheff, 1988). Yet, past a certain level, it can also give an individual social leverage to violate social norms without fear of much consequence (Sabath, 1964). However, this leverage may erode if non-conforming behaviors are repeated over time (Hollander, 1958). In sum, pride indicates where one stands in the group, i.e., high pride signals success whereas low pride signals failure in meeting the expectations of one's group. Thus, people with low pride should be more strongly motivated to conform to group standards than those with high pride.

Both shame and pride (or its lack) function to promote conformity by providing internal reward and punishment respectively. Costs of potential sickness can be managed by ensuring one has reliable allies who would provide support in the event of ill-health. And, if the increase in conformity due to disease threat serves cost-management, a function distinct from avoidance of pathogens, this heightening effect should be mediated by the experience of pride and shame, independent of that of disgust.

Based on this analysis, I propose a model that links disease threat to conformity via the emotional experience of pride and shame (see Figure 2). According to this proposed model, disease threat, given the potential harm it could cause, would lead to a psychological state of

vulnerability and perceived susceptibility to sickness. This state of vulnerability would, probably due to a concern with potential effects of sickness, cause a desire to seek coalitions. This desire would, in turn, be motivated by the proneness to experience more shame and less pride in oneself. For example, an individual growing up in an infection-ridden environment would constantly be in a state marked with physiological and psychological stress associated with potential threats to his/her health. Such a state would make the individual more active at seeking venues and opportunities to find others to form cooperative relationships with. Individuals motivated to seek social coalitions would be more prone to experiencing shame (internal punishment) and less so to experiencing pride (internal reward) in social situations. Thus, disease threat should lead to heightened shame and diminished pride, which would, in turn, cause one to strive harder to meet social standards, and so, lead to stronger adherence and conformity to in-group norms.

## **Hypotheses**

Based on the proposed model, the research presented in this paper tested the following hypotheses.

- *Hypothesis 1.* Disease salience will increase conformity to social influence from the in-group.
- *Hypothesis 2.* Disease salience will heighten the experience of shame and lower that of pride in the context of in-group.
- *Hypothesis 3.* Shame will increase conformity; pride will decrease conformity.

I tested these hypotheses over the course of three studies conducted on KU undergrads. Study 1 employed a correlational design to investigate the relationships between individual differences on chronic disease salience and conformity (Hypothesis 1) , as well as the role of

shame and pride as intermediary variables in the relationship using self-report measures (Hypotheses 2 & 3). Study 2 tested the three hypotheses in a causal setup by manipulating disease salience, and observing its effects on shame, pride, and conformity in participants' attitudes about a controversial social issue (combating campus sexual assault) under social influence. Study 3 retested each of the three hypotheses advanced, and attempted to improve upon the method of Study 2 with a different target issue (preserving freedom of speech on campus) and the intermediary variables recorded in a more accurate time-order in relation with the independent and the dependent variables.

## Chapter 2: Study 1

Study 1 was designed to explore the relationships between a variety of indicators of chronic disease salience and conformity, and the intermediary role of shame and pride in the process. I tested the hypotheses that disease salience will predict conformity and this relationship will be mediated by the emotions of shame and pride. I measured individual differences in chronic disease salience, conformity, and experiences of pride and shame using self-report instruments. If the proposed hypotheses were valid, one would expect chronic disease salience to be positively associated with conformity. I also expected this relationship to be mediated by chronic levels of shame and pride such that disease salience would be associated with higher shame and lower pride, each of which would, in turn, predict increase in conformity.

### Method

**Participants.** Two hundred eighty nine English-speaking participants (206 female; age 18-34,  $M_{age} = 18.82$ ,  $SD = 1.65$ ) were recruited via the Department of Psychology's Online Participation System. Participants completed the study online to receive course credit.

**Materials and procedure.** After signing up and consenting to the information statement, each participant was presented with a Qualtrics survey link consisting of questionnaires measuring chronic disease salience (predictors), pride, shame proneness (mediators), and conformist tendencies (outcome variables). Participants were instructed to pay full attention to the contents of the survey and make sure there were no distractions environment while they were answering the survey questions.

**Disease salience.** Chronic disease salience was assessed by two individual difference measures; the 14-item Perceived Vulnerability to Disease scale (PVD: Duncan, Schaller, & Park, 2009), and the 25-item Disgust Sensitivity scale (DS: Olatunji et al., 2007). PVD has two

subscales, namely Perceived Infectability (PVD-PI) that measures beliefs about proneness to infections (e.g., "If an illness is 'going around', I will get it") and Germ Aversion (PVD-GA) that measures reactions to potential disease carriers (e.g., "It really bothers me when people sneeze without covering their mouths"). DS subscales include Core Disgust (DS-Core: "If I see someone vomit, it makes me sick to my stomach"), Animal Disgust (DS-Animal: e.g., "It would bother me tremendously to touch a dead body"), and Contamination Disgust (DS-Contamination: "e.g., I never let any part of my body touch the toilet seat in public restrooms"), which mark the experience of offensiveness and disgust under various situations, aversion to stimuli that remind one of animal nature of humans, and aversion to contaminated entities respectively. Due to the weak or no correlations between subscales of each of the two measures, data were analyzed considering each subscale a distinct variable.

***Shame and pride.*** Shame proneness and pride were measured using the 8 items of Guilt and Shame Proneness scale measuring Shame (Cohen, Wolf, Panter, & Insko, 2011) and the Authentic Pride scale (Pride: e.g., "I generally feel confident"; Tracey & Robins, 2007) respectively. Subscales of Shame include Withdrawal (SHW: e.g., "You take office supplies home for personal use and are caught by your boss. What is the likelihood that this would lead you to quit your job?") and Negative Self-Evaluation (SHNSE: e.g., "You give a bad presentation at work. Afterwards your boss tells your coworkers it was your fault that your company lost the contract. What is the likelihood that you would feel incompetent?"). These subscale were treated independently in the analysis due to the lack of correlation between them observed in previous studies (see Cohen, Wolf, Panter, & Insko, 2011).

***Conformity.*** Finally, I included two indicators of conformity as outcome variables, namely a 10-item conformity scale from the International Personality Item Pool (CS: e.g., "I

conform to others' opinions", Goldberg et al., 2006) and a 6-item measure of conformist values (CV: e.g., "Obedience and respect for authority are the most important virtues children should learn") developed by Murray and Schaller (2012). In the end, participants answered some basic demographic questions (see Appendix A for details of the measures used) and read the debriefing statement.

## Results

Participants who reported simultaneously working on another task while answering the questionnaires were removed from the final analysis ( $N=50$ ) to ensure data quality. Table 1 shows the reliability coefficients for and correlations among the predictors and outcome variables in Study 1 ( $N=239$ ). Alphas ranged from a low .51 (DS-Contamination) to a high .91 (Pride). A correlation analysis of data from Study 1 shows that all predictor and mediating variables had a significant zero order correlation with Conformity except PVD-PI. Further, PVD-PI and PVD-GA were uncorrelated, which was contrary to Duncan, Schaller, and Park (2009) who found a small positive correlation between the two subscales. All DS subscales were positively correlated with each other with a high  $r=.68$  between DS-Core and DS-Animal. Finally, there was a small positive correlation between the two indicators of conformity ( $r=.18$ ,  $p<.01$ ). Regression analyses predicting conformity from the 2 PVD and 3 DS variables (Table 2) shows PVD-GA and DS-Animal significantly predict conformity whereas only DS-Animal significantly predicted CS.

To test the hypothesis that the relationship between chronic disease salience and conformity will be mediated by pride and shame, I ran two path models (one for CS and the other for CV) with all the hypothesized predictors in it. This follows Hayes (2009) who recommends including even those predictors of interest in the model that may show no total

effect on the outcome variable (also see MacKinnon, Fairchild, & Fritz, 2007). Further, I included all the mediators of interest in both models except SHNSE, which was removed in the model predicting CV due to having no zero-order correlation with the outcome variable. Upon initial testing of the two models, core disgust showed no direct or indirect effect on either of the outcome variables ( $p$ 's for indirect effects were .94 and .80 for CS and CV respectively). Therefore, it was excluded from the final models.

Results of the path models are presented in tables 3 and 4. Model 1 predicting CS (Table 3 & Figure 3) shows a close fit,  $\chi^2(2, N=239)=.387, p=.824, CFI=1.0, TLI=1.18, RMSEA=.000$ . A high  $p$ -value indicates that the specified model closely fits the structures found within the dataset. DS-Animal was the only predictor that had a significant direct path to CS ( $\beta=.25, p<.001$ ), whereas that of PVD-PI was marginally significant ( $\beta=-.11, p=.083$ ). Effects of PVD-PI on SHW and Pride were as predicted ( $\beta=.25, p<.001$  and  $\beta=-.11, p=.077$ ); however, the latter was marginal. PVD-GA had no direct effect on any of the endogenous variables, whereas DS-Contamination had a positive path to SHW ( $\beta=.17, p<.05$ ). DS-Animal had a significant positive path to SHNSE ( $\beta=.14, p<.05$ ) and a marginal path to SHW ( $\beta=.13, p=.067$ ). All three mediators had significant paths to CS (SHW:  $\beta=.19, p<.01$ ; SHNSE:  $\beta=.20, p<.001$ ; Pride:  $\beta=-.30, p<.001$ ). Finally, PVD-PI was the only predictor with an indirect effect to CS ( $\beta=.10, p<.001^2$ ).

Model 2 predicting CV (Table 4 & Figure 4) also had a close fit,  $\chi^2(1, N=239)=.10, p=.75, CFI=1.0, TLI=1.18, RMSEA=.000$ . PVD-GA, DS-Animal, and SHW had significant direct paths to CV ( $\beta=.15, p<.05$ ;  $\beta=.20, p<.01$ ; and  $\beta=.24, p<.001$  respectively); whereas, the

---

<sup>2</sup> Significance levels for all indirect effects were obtained via bootstrapping ( $N=5000$ ).



path from Pride to CV was positive but marginal ( $\beta=.11, p=.058$ ). Direct effects of predictors on mediators (SHW and Pride) were identical to those in the previous model. Finally, PVD-PI and DS-Contamination each had a small but significant indirect effect on CV ( $\beta=.05, p<.05$  and  $\beta=.04, p<.05$  respectively), whereas that of DS-Animal was marginal ( $\beta=.04, p=.081$ ).

## Discussion

I predicted that chronic disease salience would predict (i) increase in conformity, (ii) increase in shame (iii) decrease in pride, and (iv) shame would predict increase whereas pride would predict decrease in conformity. Models 1 and 2 tested the relationships of vulnerability to disease (PVD-PI and PVD-GA) and disgust sensitivity (DS-Core, DS-Contamination, and DS-Animal) with two distinct indicators of conformist tendencies (CS and CV) and the intermediary role of shame (SHW and SHNSE) and pride in this relationship. The analyses yielded somewhat different results vis-a-vis the hypothesized model.

In Model 1, DS-Animal had a direct and PVD-PI had an indirect (via SHW) positive relationship with CS. In Model 2, PVD-GA and DS-Animal had only direct positive relationships with CV, whereas PVD-PI and DS-Contamination had small but positive indirect relationships with CV.

These findings partially support the hypothesized model while bringing to light some new insights in the processes underlying the relationship between disease salience and conformity. Chronic disease salience was positively associated with conformist tendencies and this relationship was sometimes mediated by shame. Even though, both CS and CV are related to individual differences in conformist tendencies, the weak correlation between the two indicates lack of overlap. Namely, CS measures behavioral tendency to conform, while CV estimates how much one values conformity in society. This study found that beliefs about one's infectability

predicted higher levels of shame, which in turn, predicted higher levels of conformist behaviors and values. Contamination- and animal-related indicator of chronic disease salience also, partly via shame, positively predicted conformist tendencies.

There were two observations that were contradictory to my predictions. First, PVD-PI, had conflicting paths with opposite signs to both CS and CV: indirect positive paths and direct (but non-significant) negative paths. This is an example of inconsistent mediation (MacKinnon, Fairchild, & Fritz, 2007), which arises when a predictor is affecting an outcome variable differently via different processes. However, the disease threat model offers no predictions either regarding this negative effect or the process that underlies it. Also, there are no findings in past literature that have discovered the negative relationship of infectability thoughts with conformist values. Thus, it will need further conceptual and empirical work to investigate what process underlies this negative relationship, provided this relationship is reliable. Second, the marginal but positive relationship of Pride with CV was contrary to what I predicted about pride (i.e., pride will be negatively associated with conformist tendencies). I suspect this to be the work of a feedback loop where pride and conformist values feed into each other such that where a decrease in pride increases conformity (as seen in Model 1), high conformity and adherence to conformist values (caused by other variables) lead to high pride and vice versa.

Due to the exploratory nature of Study 1, I made only general predictions regarding the roles of each of the 5 indicators of chronic disease salience. Namely, I did not specifically predict as to which of the five indicators of disease salience should and should not affect conformity. This lack of specification is due to an absence of theoretical and empirical work on the topic. Past research on the relationship between disease salience and conformity (e.g., Murray & Schaller, 2012) has only used PVD to measure disease salience. The body of research on disgust

sensitivity has found it to be associated with ethnocentrism ((Navarrete, Fessler, & Eng, 2007), moral contempt (Wheatley & Haidt, 2005), and conservative political attitudes (Inbar, Pizarro, & Bloom, 2009). Though, no evidence or predictions of its relationship with conformity exist in the literature. This is, to my knowledge, the first research that investigated the relationship between disgust sensitivity and conformity. Therefore, the findings of this study are exploratory and will need replication to ascertain their reliability.

The results of Study 1 provided preliminary evidence regarding the hypothesized relationship between disease salience and conformity, and the role of shame in this relationship. While I established the relationship between indicators of disease salience and two different aspects of conformist tendencies, the evidence regarding the intermediary role of pride was inconclusive. Also, given the correlational nature of Study 1, further experimental investigation of the phenomenon was necessary in order to establish causality. Studies 2 and 3 were designed to serve both these purposes by manipulating disease salience and observing its effects on conformity, as well as the role of momentary experiences of shame and pride in mediating those effects.

To date, two papers have been published based on experimental work in this area. First, Wu and Chang (2012) primed Chinese college students with disease-related imagery and recorded their ratings of several pieces of modern art. They showed that participants who were primed with disease-related stimuli conformed their responses more closely to the average ratings alleged provided by a make-believe group of students. Second, Murray & Schaller (2012) provided findings more closely relevant to our research. They made their participants think about disease and then presented them with "a potential scenario in which their university might change the numerical scale on which course grades are reported on student transcripts and were

asked to indicate whether they agreed or disagreed with this potential change" (p. 182). Their results show that conformity to majority influence increases when participants are made to think of disease.

Though, Wu & Chang's (2012) and Murray and Schaller's (2012) findings provide preliminary evidence regarding the effects of disease salience on conformity, they lack two things. First, their findings do not explain the process by which disease salience leads to conformity. Neither study demonstrated what psychological state links disease salience with conformity. Second, neither of the two studies measured their participants' relevant group identification, or their baseline on the outcome behavior, i.e., how participant would have acted if there was no normative information regarding the paintings and the proposed policy change in grade reporting in Wu and Chang (2012) and Murray & Schaller (2012) studies respectively. Social attitudes are hugely influenced by in-group norms (Sherif, 1936; Moscovici, & Zavalloni, 1969). Further, people respond to counter-attitudinal influence differently when their existing attitudes are anchored within norms of such in-groups (Kelley & Volkart, 1952; Kelley, 1955). For example, those who strongly value their affiliation to a group tend to show strong resistance against persuasion attempts aimed at changing attitudes anchored within the group. Thus, participants' existing attitudes not only play a substantial role in predicting behavior in realistic social settings, but can also be used to indicate affiliation to particular in-groups. I address both of these shortcomings in studies 2 and 3, and aim to provide answers to the questions arising out of these shortcomings, i.e., (i) what is the process underlying the effect of disease salience on conformity? and (ii) how do people respond to counter-attitudinal influence in the presence of existing convictions? I do so by including participants' immediate experiences of shame and

pride in the study as potential mediators, as well existing attitude related to target policy as a moderator (see Figure 2).

For both studies 2 and 3, I predicted that disease salience would make people more susceptible to majority influence and this effect would be more pronounced when the majority stance were congruent with recipient's existing attitudes relevant to the target issue. This means that, when disease is salient, people who are for a position will more readily conform to pro-position influence than to anti-position influence and vice versa. I also predicted that people would feel more shame and less pride in disease salience condition, and that shame would increase whereas pride would decrease conformity. And finally, I predicted that shame and pride would mediate the effect of disease salience on conformity, but disgust will not.

### Chapter 3: Study 2

#### Method

**Participants.** Two hundred ninety English-speaking participants ( $M_{Age}=19.1$ ,  $SD=1.82$ , 149 *Female*) were recruited via the KU Department of Psychology's subject pool<sup>3</sup>. Participants received research credit for their participation.

**Design.** The study was conducted in the laboratory in groups of up to 4 participants at a time. After signing the consent statement, participants were randomly assigned to one of the 6 (2x3) experimental conditions created by crossing the two independent variables, namely disease salience (Flu and white-tail deer) and normative influence (Influence: anti-policy, neutral, and

---

<sup>3</sup> In both studies 2 and 3, the sample size was selected based on an a priori power analysis for a 2x3 (disease salience x Influence) ANOVA, which yielded a sample size of  $N=211$  for  $f=.25$  and  $1-\beta=.8$ .

pro-policy). The dependent variable was participants' approval of the proposed "policy against campus sexual assault"<sup>4</sup> (Approval).

***Disease salience.*** The independent variable, disease salience, was manipulated by making participants think about infectious disease. Participants were presented with a passage that discussed the perils of influenza and asked to pay close attention to the details of the passage, as they were to be asked questions about it at the end. The text read as following:

Influenza (also known as the flu) is a contagious respiratory illness caused by flu viruses. It can cause mild to severe illness, and at times can lead to death.

The flu is different from a cold. The flu usually comes on suddenly.

Most people who get influenza will recover in a few days to less than two weeks, but some people will develop complications (such as pneumonia) as a result of the flu.

Anyone can get the flu (even healthy people), and serious problems related to flu can happen at any age, but some people are at higher risk of developing serious flu-related complications if they get sick.

After reading the passage, participants were asked questions about the passage to make sure they were paying attention. They were also asked to recall the last encounter they had with a person exhibiting symptoms of flu and write about their thoughts and feelings during that encounter. Finally, participants were asked to recall the last time when they had flu and pick from a list of 8 symptoms the ones they experienced.

---

<sup>4</sup> This issue was selected due to its currency at the time of the study and its relevance to KU student population.

People in the control condition read a passage about white-tail deer that described the deer's morphology, habitat, diet, and mating habits (Appendix C1). After completing the reading, participants answered questions about the contents of the passage. They were also asked to describe white-tail or any other species of deer they have seen live.

***Normative influence.*** Following the disease salience manipulation, participants were presented with another passage that discussed proposed policy regarding the issue of sexual assault on KU campus. The passage read as follows:

The University of Kansas is under federal investigation in response to a complaint filed by a student who had reported she was raped as a freshman in October 2013.

Following a university investigation, the accused student was punished with probation, a ban on student housing and a so-called reflection paper. The school decided against adding community service for it would be "strictly punitive."

After the *Huff Post* report, KU students—using a play on the KU slogan, "A great place to be"—unleashed a hail of angry tweets under the hash tag

#aGreatPlaceToBeUnsafe. Several student organizations have been taking part in condemning KU's handling the issue and for being too soft on the accused, and treating sexual assault as something less than a crime. The KU Chancellor responded to these demands promising to review the KU policy on sexual assault, provide a speedier resolution of the charge, and to improve the training of staff members on panels of inquiry.

Several other student groups are criticizing the policy proposals. They say that it is important to protect the due process rights of the accused. They have argued that anyone accused of sexual assault must have a fair opportunity to a proper defense,

guaranteed by the Bill of Rights of the U.S. Constitution. The opponents of this new policy argue that investigations of such crimes should be carried out by law enforcement, who are less concerned about protecting KU's image. These objectors have been posting online, distributing pamphlets around Lawrence, and chalking the KU campus to get their message out.

There is a lot of debate taking place on this topic, making it a highly controversial issue on KU campus.

Upon completion of the reading, participants were invited to express their views about the issue discussed in the passage. Each participant was presented with 7 computerized response sheets each containing one statement (e.g., "KU's sexual assault policy should include stronger punishments") concerning the proposed policy with a 7-point response scale with 1 = "Strongly Disagree" and 7 = "Strongly Agree". This measure was adopted from the instrument used by Blanchard, Crandall, Brigham, and Vaughn (1994; also see Crandall, Eshelman, & O'Brien, 2002).

Influence was manipulated by presenting participants with make-believe responses from "previous participants". Both in the anti-policy and the pro-policy conditions, I made the response sheets so that each of them contained 8 previous responses. In the anti-policy condition, "previous participants" had strongly disapproved the proposed policy ( $M=1.625$ ), whereas they had strongly approved of it ( $M=6.375$ ) in the pro-policy condition. There were no make-believe responses in the neutral condition.

***Approval of policy & conformity.*** Participants' responses to the 7 statements presented were aggregated to calculate mean Approval of policy. I defined conformity as the participants' degree of agreement with "previous responses" in each condition of influence. However, no



score was calculated to indicate this variable. Instead, I used correspondence between the approval score and the direction of social influence (i.e., high approval in pro-policy condition and vice versa) to assess conformity.

***Shame, pride, & disgust.*** Instantaneous experiences of shame, pride, and disgust were recorded immediately after the DV using three items (Indicate to what extent you feel this way RIGHT NOW: "Ashamed", "Proud", and "Disgusted") on a 5-point (1="not at all" to 5="extremely") scale from the Positive and Negative Affects Schedule (PANAS: Watson, Clark & Tellegen, 1988).

***Existing attitudes.*** I also included the short form (10 items) of the Liberal Feminist Attitudes and Ideology Scale (LFAIS: e.g., " Women in the U.S. are treated as second-class citizens."; Morgan, 1996) as a measure of endorsement of feminist ideology on a 6-point scale (1="strongly disagree" to 6="strongly agree").

***Other measures.*** In the end, participants reported their current level of sickness (Sickness: "How sick do you feel right now?") as a screening variable to detect and exclude considerably sick participants from the analysis. They also reported their age and gender. Finally, participants were debriefed and thanked.

## Results

Tables 5 and 6 present descriptive statistics of the observed variables, while Table 7 lists the zero order correlations between the independent variables (IVs), the dependent variables (DVs), the mediators (MVs), and the covariates of interest. As expected, influence manipulation had a strong positive correlation with Approval, i.e., people in the anti-policy influence condition reported lower approval and those in pro-policy condition reported higher approval than the neutral condition. Similarly, sex and LFAIS both were positively correlated with Approval, i.e.,

women as well as those strongly endorsing feminist ideology reported higher approval for the proposed policy.

Forty seven participants who either reported being more than "slightly sick" ( $>2$  on a 5 point scale,  $N=20$ ) or had not provided their level of sickness ( $N=27$ ) were excluded from the final analysis. Actual sickness is presumed to make disease salient in a way similar to the disease salience manipulation I used. Further, since sickness causes actual immune system activity, it could have introduced unknown variables that could confound the findings of the study. Therefore, I excluded the aforementioned participants to ensure soundness of the design<sup>5</sup>.

Since no individual scores were calculated for conformity, the effect of influence on participant's Approval of the proposed policy was used as an indirect measure for it, i.e., higher approval in the pro-policy condition whereas low approval in anti-policy condition was considered conformity.. In order to test the prediction that disease salience will enhance the effects of influence, I ran a general linear model (GLM) predicting Approval from disease salience and Influence as factors and LFAIS as a moderator. Results of the model are presented in Table 8.

Influence had a strong main effect on Approval,  $F(2, 230)=7.56, p<.001, \eta=.25$ , such that pro-policy Influence resulted in high approval and vice versa. LFAIS also had a positive main effect on Approval,  $F(1, 230)=34.11, p<.001, \eta=.36$ , while disease salience did not,  $F(1,230)<1$ .

The primary effects of interest were (i) the two-way interaction between Influence and disease salience, which tested the hypothesis that at least one simple effect of disease salience

---

<sup>5</sup>GLM including the entire sample yielded marginal effects of disease salience x Influence and disease salience x Influence x LFAIS ( $ps \leq .10$ ). Other effects remained unaltered.

was significantly different from another, and (ii) the three-way between the two IVs and LFAIS, which tests that the interaction effect of the two IVs significantly different at different levels of LFAIS. Both of these effects were significant,  $F(2, 230)=3.28, p<.05, \eta=.17$  and  $F(2, 230)=3.71, p<.05 \eta=.18$  respectively. None of the simple effects of disease salience were significant under any condition of Influence. However, estimated means of Approval under different conditions of Influence and disease salience (Figure 6) show that disease salient participants express (near-significantly) more approval ( $p<.1$ ) when they are influenced to be anti-policy at the mean of LFAIS.

To further understand the two-way and the three way effects, I have plotted Influence X disease salience at three levels of LFAIS ( $-1SD$ , mean, and  $1SD$ ) in Figure 7. At  $-1SD$  of LFAIS, participants in the Flu condition showed higher Approval of policy ( $M=5.13$ ) than those in deer condition ( $M=4.77$ ) under pro-policy influence. When influence was anti-policy, participants in Flu condition showed lower Approval of policy ( $M=2.78$ ) than those in Deer condition ( $M=2.58$ ). However, both these differences were non-significant. At mean of LFAIS, the only difference was found in the anti-policy condition of influence where disease salient participants approved of policy more ( $M=3.45$ ) than disease-non-salient ones ( $M=3.06$ ). This simple effect was marginally significant ( $p<.1$ ). Finally, at  $+1SD$  of LFAIS, participants in the Flu condition showed significantly higher approval than those in the Deer condition ( $M=4.08$  vs.  $M=3.27, p<.01$ ). No differences were found in the pro-policy and the neutral conditions of Influence.

To test the intermediary role of pride and shame in the link between disease salience and conformity, I tested a multi-group multi-mediation model by predicting Approval by disease salience, LFAIS, and the interaction between disease salience and LFAIS (see Figure A1). The output was organized by Influence such that each condition of Influence had its own set of

parameters. The structure of the model is depicted in Figure A1, and the results are presented in Tables A1–A4 (see Appendix A).

Model presented in Table A1 including all observations collapsed across all conditions of Influence shows a significant positive effect of disease salience on Shame, ( $\beta=.16, p<.01$ ). No other effects were significant. The next three models broke down the observations into the three levels of influence. In the anti-policy condition, the interaction between disease salience and LFAIS was significant ( $\beta=.65, p<.05$ ). Disgust had a negative effect on Approval ( $\beta = -.39, p < .05$ ) in the neutral condition. And finally in the pro-policy condition, disease salience had a positive effect on shame ( $\beta=.23, p<.05$ ). No other effects (direct or indirect) were significant.

## Discussion

Results of Study 2 showed that disease salience did not increase conformity to social influence regarding the proposed policy against sexual assault. Instead, it evoked opposition to anti-policy influence. Further, this effect was contingent upon levels of commitment to feminist ideology, i.e., responses of people with high commitment showed most opposition to anti-policy influence under disease salience. There was no opposition observed in response to pro-policy influence. Those with low commitment to feminist ideology were more susceptible to both pro- and anti-policy pressures when disease was salient. Further, there was no evidence to suggest that shame and pride mediated this relationship between disease salience and conformity or opposition.

These findings are contrary to my predictions. Under no condition of Influence did participants exhibit significantly more conformity when disease was salient than when it was not. Further, disease salience did not lower approval of proposed policy when the majority opinion was against it and vice versa. However, disease salience did evoke resistance among participants

with high commitment to feminist ideology such that they went against the majority influence when the majority took an anti-policy stance. No such opposition was observed when the majority position was pro-policy.

These results suggest that, in the realm of social matters, the conformity inducing effect of disease salience is conditional upon a person's existing levels of commitment to beliefs and ideologies relevant to the target. Participants with high commitment to a target position resist majority influence against said position, especially when disease is salient. In other words, when a person is highly committed to an opinion, disease salience promotes conformity to attitude-congruent influence. However, when influence is attitude-incongruent, disease salience can instead evoke opposition to influence in a highly committed person.

Sexual transgressions are known to evoke moral outrage, and so one potential reason for this discrepancy by predictions and the findings may be that our participants on average had a strong moral conviction that favored the proposed policy. Such individuals will see the strong negative influence to oppose the proposed policy as a morally depraved stance. If that were the case, replacing the sexual assault issue with another issue with relatively weaker moral undertones, would help the predicted patterns of results to emerge.

My prediction about the intermediary role of shame & pride in the relationship between disease-salience and conformity was also not supported by the results of this study. There was no evidence that shame and pride were responsible for transmitting the effect of disease salience onto conformity. However, this lack of evidence may have been caused by a design limitation that the hypothesized mediators were indeed recorded in the incorrect time-order, i.e., after the DV. I corrected for this problem in Study 3 by measuring the experience of shame, pride, and disgust immediately after the disease salience manipulation.

### Chapter 4: Study 3

Study 3 was designed to improve the procedure of Study 2 with the following goals: (i) to test our original hypotheses with a different less morally charged target issue, and (ii) to correct the limitation observed in Study 2 by recording the mediating variables in the correct time-order relationship with the IV and the DV. To achieve (i), I introduced a different controversial social policy proposal concerning freedom of speech as the DV to ascertain that the counter-hypothetical effects of disease salience found in Study 2 weren't merely an artifact of the strong moral undertones related to the DV. I predicted that disease salience would make people conform more to social influence. I also predicted that existing attitudes related to obedience and social control would qualify the effects of disease salience on conformity such that, if disease were salient, participants with positive attitudes towards obedience would be more easily swayed with pro-policy influence and vice versa. Finally, I predicted that shame and pride would mediate the effect of disease salience on conformity.

#### Method

**Participants.** Two hundred forty eight English-speaking adults ( $M_{\text{Age}}=19.1$ ,  $SD=1.28$ , 126 *Female*) participated in the study via the KU Department of Psychology's subject pool for course credit.

**Design.** The design was similar to Study 2. Groups of up to 4 participants at a time partook in the study in a laboratory setting. Participants were randomly assigned to one of the 6 (2x3) experimental conditions created by crossing disease salience and normative influence. Participants' approval of the proposed "social media policy" (Approval) served as the dependent variable.

***Disease salience.*** Participants were exposed to one of the two conditions of disease salience by reading a passage either about the Flu or the White-tail deer. The text of the passages was the same as in Study 2. I did, however, add some pictorial information (e.g., a sneezing person) to the disease salience manipulation to enhance its potency. The passage about white-tail deer remained unaltered (see Appendix D1 for details of experimental manipulations).

***Shame, pride, and disgust.*** Immediately after the disease salience manipulation, participants were asked to report their instantaneous experiences of shame, pride, and disgust measured by the 3 PANAS items used in Study 2.

***Normative influence.*** After reporting their experiences of shame, pride, and disgust, participants read another passage describing a proposed policy to control the social media speech of KU faculty and staff. The text of the passage went as follows:

The clash between academic freedom and state oversight in Kansas continues, as the state Board of Regents revised its policy on what faculty and staff at the state's colleges and universities can post on social media.

Following harsh criticism of a policy adopted last year that severely restricted social media postings by faculty, the Board added language that is supportive of free speech and academic freedom. But it still allows administrators to suspend and fire faculty members or staffers for social media posts that are "contrary to the best interests of the employer."

The policy has been denounced from many sides, with many critics saying it gave administrators too much latitude to fire or discipline employees for what they said on social media. Among the groups speaking out was the Foundation for Individual Rights in Education (FIRE) who criticized the revised policy for authorizing

“punishment for constitutionally protected speech”. Similarly, the American Association of University Professors (AAUP) argued that some portions of the policy could lead to professors being fired simply for disagreeing with university policies or their colleagues online.

While national organizations such as AAUP and FIRE are speaking out against the Regents’ policy, voices from within the University of Kansas faculty, staff, and student bodies have been relatively ineffective.

Like in Study 2, Influence manipulation was administered by asking participants to report their Approval regarding the proposed policy on 8 computerized response sheets that contained responses from "previous participants" who had either, on average, reported a pro- ( $M=1.625$ ) or an anti-policy ( $M=6.375$ ) position. There were no "previous participant" responses in the neutral condition.

***Approval of policy and conformity.*** Same as Study 2, participants' responses to the 8 statements presented were averaged to calculate Approval of policy. Conformity, being the participants' agreement with the majority norm, was indirectly assessed using the degree of association between approval scores and the direction of social influence.

***Existing attitudes.*** To measure participants' existing attitudes related to the issue of free speech, I also asked participants to rate 5 qualities (Hardworking, Independent, Open-minded, Religious, Obedient) according to how important they think it would be for children to learn (1 = least important, 7 = most important, adapted from Murray & Schaller, 2012). I expected that value for obedience and religiousness would positively whereas that for open-mindedness and independence would negatively predict approval of the policy restricting free speech. Therefore, these questions were included as potential moderating variables.



**Other Measures.** Participants also reported their current level of sickness, gender, and age. In the end, participants were debriefed and thanked.

## Results

Participants who reported being more than "slightly sick" on the day of the experiment were excluded from the analysis ( $N=31$ ) following the same strategy as in Study 2<sup>6</sup>. Zero order correlations between the IVs, the DVs, the MVs, and the covariates of interest are presented in Table 9. Influence was strongly ( $r=.66, p<.01$ ) and Religiousness was weakly correlated ( $r=.15, p<.05$ ) with Approval. Results of a regression analysis predicting Approval from 5 social values (Hardworking, Independent, Open-minded, Religious, & Obedient) show that Religiousness was the strongest and the only near significant predictor ( $\beta=.15, p=.057$ ) of approval. Therefore, religiousness was included as a moderator of Approval in the subsequent analysis.

Means and standard deviations of Approval under each condition of disease salience and Influence (Table 9) suggest a strong main effect of Influence on Approval. This is confirmed by the results of the GLM predicting Approval of proposed policy restricting free speech from disease salience, Influence, and Religiousness, and their 2- and 3-way interactions (Table 10). Influence was again a strong predictor of Approval ( $F(2, 203)=8.99, p<.001, \eta=.29$ ), whereas the interaction between Influence and disease salience was also significant ( $F(2, 203)=3.45, p<.05, \eta=.18$ ). Religiousness was also a significant predictor of Approval ( $F(1, 203)=4.64, p<.05, \eta=.15$ ), while the 3-way interaction between disease salience, Influence, and Religiousness was near significant ( $F(2, 203)=2.94, p=.055, \eta=.17$ ).

---

<sup>6</sup> Analysis including all the participants rendered effects of disease salience x Influence and disease salience x Influence x Religiousness non-significant, and that of Religiousness marginal ( $p=.065$ ). Other effects remained unchanged.

The estimated marginal means of Approval under each condition of disease salience and Influence at the mean of Religiousness are presented in Figure 8 that shows a strong effect of Influence. None of the simple effects of disease salience were significant under any of the Influence conditions. Further examination of our data shows that this 2-way effect is qualified by Religiousness such that low Religiousness participants are more susceptible to the effect of disease salience under the pro-policy condition ( $p < .1$ , see Figure 9). The differences between flu and deer conditions were non-existent for high Religiousness participants.

I also predicted that the effect of disease salience on Approval will be partially mediated by Pride and Shame, but not disgust. To test that prediction, I ran the multi-group path model (Figure A2) which predicts Approval from disease salience, Religiousness, and their interaction. Further, Shame, Pride, and Disgust are included in the model as mediators of the effect of disease salience on Approval. Results of the path model for the overall sample and for each of the conditions of Influence are presented in Tables A5–A8 (included in Appendix A).

The model collapsed across all conditions of Influence (Table A5) shows a near reliable effect of disease salience on disgust ( $\beta = .14$ ,  $p = .057$ ), such that people in the Flu condition report feeling more disgusted. No other paths were significant in this model. The second model (Table A6) depicting the data structure in the anti-policy condition of Influence looks very similar to the overall model with a marginal path from disease salience to disgust ( $\beta = .19$ ,  $p = .108$ ) and no other reliable effects. In the neutral condition of Influence (Table A7), Religiousness ( $\beta = -.77$ ,  $p < .05$ ) and its interaction with disease salience ( $\beta = .95$ ,  $p < .05$ ) significantly predicted Approval. No other paths were significant. Finally in the pro-policy condition of Influence (Table A8), none of the predictors had a reliable effect on the outcome. The only near-significant pathway led from Pride to Approval ( $\beta = .19$ ,  $p = .082$ ).

## Discussion

Disease salience (marginally) increased conformity to social influence in supporting the proposed social media policy that would restrict freedom of speech at low levels of Religiousness such that people who valued religiousness little conformed more to pro-policy influence when disease was salient. When low-religiousness participants were made to think of disease, they acted like high-religiousness participant, showing similar endorsement of the policy that would curb freedom of speech. There was no effect of disease salience in the anti-policy condition at any level of Religiousness.

Results of Study 3 were different from my predictions. First, I did not find any relationship between the value for obedience or independence (the more likely covariates of attitudes towards free speech) and approval of the proposed policy (the DV). The only near significant predictor of the DV was religiousness, which was expected to be only obliquely related to the DV. While the relationship between religiousness and attitude toward censorship is no surprise, it was unexpected that value for obedience and independence, the more obvious covariates, had no relationship with the DV. This counter-hypothetical finding calls for more elaborate testing of the hypothesis using multi-item measures of the hypothesized covariates, and other variables (e.g., Right-wing Authoritarianism; Lambe, 2008) with stronger theoretical and empirical relevance to free speech attitudes. Second, instead of a shifting conformity effect over increasing levels of religiousness (high conformity in anti-policy condition among low religiousness and vice versa), disease salience only increased conformity among low-religious participants in the pro-policy condition. These findings are different from Study 2 in that, instead of evoking opposition to influence, the current design was adequate to sway the participants in the direction of conforming. It would be reasonable to conjecture that this shift in results was due

to the nature of the target issue because of two reasons. First, strong endorsement of the proposed social media policy meant supporting restrictions on free speech, which appears to be a less popular position in my sample indicated by a non-existent effect of disease salience in the anti-policy (pro-free-speech) condition. Second, highly religious people were strongly inclined to endorsing the policy against free speech, and thus their approval cannot be improved any further via pro-policy influence. Instead, I observed strongest effects of disease salience in the pro-policy (anti-free speech) condition for low-religiousness people because there was room in their existing attitudes to be swayed in a pro-policy direction. When primed with disease, less religious people acted like highly religious people in terms of conforming to anti-free speech position of a majority.

Like in Study 2, effects of disease salience on conformity were not mediated by shame, pride, or disgust. There was no evidence, whatsoever, to corroborate the predictions about the intermediary role of shame and pride in the relationship between disease salience and conformity. This implies the mediation hypothesis I posited was not true.

## Chapter 5: General Discussion

The current project set out to understand the role of disease threat in promoting conformity. I argued that increased conformity in response to disease threat does not perform a disease-avoidance function. Instead, it helps manage costs of potential sickness, should infection turn into ailment. If that is true, the effect of disease threat on conformity should be transmitted via a different mechanism than disgust.

I hypothesized that emotions of shame and pride would comprise that distinct mechanism. I posited that while disease threat would increase conformity, this effect would be mediated by pride and shame, and not by disgust. Specifically, I was interested in elaborating on how chronic and momentary salience of disease affects the stances people choose to adopt in social situations. Previous studies (e.g., Murray, Schaller, & Suedfeld, 2013; Murray & Schaller, 2012) have shown that chronic disease salience is associated with conformist tendencies, whereas momentary disease salience increases conformity when target attitudes and behaviors are of little social relevance.

I predicted that disease salience would increase conformity. I also hypothesized shame and pride would mediate the relationship between disease salience and conformity. Both these predictions were supported by correlational data, but the experiments did not establish the hypothesized causal pathways.

Findings of the two experiments, with regards to Hypothesis 1, were complex and call for careful consideration. First, in both Studies 2 and 3, disease salience did not increase conformity on its own. Rather, its effects on conformity were heavily dependent on the strength of existing group-relevant attitudes, which may be determined by one's affiliation to specific in-groups (Kelley, 1955; Sherif, 1936; Moscovici, & Zavalloni, 1969). A conformity-like pattern of

responses emerged from disease salience, i.e., participants' responses were more aligned with the majority when exposed to disease-related stimuli, only when existing attitudes relevant to the target issue were weak. Second, disease salience caused opposition to counter-attitudinal influence in Study 2, i.e., participants' opposed majority influence under disease salience, when existing attitude on the issue was strong. In Study 3, no such opposition was observed among high-religiousness participants. These findings suggest that disease salience may not increase conformity globally, i.e., to just any majority influence. Instead, disease may be causing an increase in the perceived importance of and loyalty to the in-group, which, in turn, leads to stronger conformity only to norms valued by the in-group.

Findings of Study 2 and 3 seem contradictory to the findings of previous research. Past research suggests that disease salience leads to higher conformity (e.g., Murray & Schaller, 2012; Wu & Chang, 2012), an effect I did not observe in this research. However, my findings are consistent with the theoretical position that, when threatened with sickness, humans turn to their in-group to seek alliances and social support (Navarrete & Fessler, 2005). Disease threat leads to conformity to in-groups because conforming to the in-group standards helps one indicate one's loyalty and trustworthiness to the group, which can be crucial in gaining acceptance and support of the group. Therefore, it is reasonable to expect that disease salience would increase conformity only to the standards that represent one's in-group. A global increase in conformity (as suggested by Murray & Schaller, 2012) would mean an equally high susceptibility to influence from out-groups as well, which may be perceived as disloyalty and deviance from the in-group standards. Thus, such a global increase in conformity would not only be detrimental in procuring new alliances, it might also cause the individual to lose the existing ones. Due to these costs, a maladaptive response such as this couldn't have evolved.

I posit that the opposition to anti-policy influence by disease salient participants (Study 2) who strongly endorse feminist ideology is indeed their attempt to conform to in-group norms. I offer two theoretical accounts and empirical findings to support this claim. First, the opposition observed in Study 2 can be explained by Self-Categorization Theory (SCT; Turner, 1991), which posits that one is more likely to conform to the norms and majority consensus of a group one socially identifies with. When in-group identity is salient, people are more likely to conform when normative pressure comes from their in-group, whereas influence from an out-group can lead to opposition. Kelley (1955) found that when their Catholic identity was salient, high-school students resisted majority influence from non-Catholic students on matters that Catholic Church had pre-existing norms about. Similarly, McGarty, Haslam, Hutchinson, & Turner (1992) showed that the same message coming from an out-group member was less persuasive than from an in-group member when social identity was salient.

In the current research, when participants who strongly identified with feminist ideology were exposed to a majority that clearly opposed reforms against sexual assault, it likely made their identity as feminists salient and they started seeing the anti-reform majority as an out-group. Even though there were no cues provided to the participants regarding the group-membership of the influencing majority, their stances were clearly against the norm (i.e., opposing sexual assault) of the in-group. Past research has shown that individuals failing to conform to a group's prototype are evaluated negatively (Hogg, Cooper-Shaw, & Holzworth, 1993; Hogg & Hardie, 1992) and may be rejected by other group members (Marques & Paez, 1994). This prototypical dissimilarity of majority responses may have been a sufficient cue for the participants to perceive the influencing majority either as an out-group, or reject them as deviant in-group members. Opposing the influence of such an out-group or deviant in-group

members who are perceived as detrimental to the group (Marques & Paez, 1994) is consistent with the predictions of SCT.

Emotional Intensity Theory (EIT: Brehm, 1999) offers goal-oriented approach to the problem at hand. Goals are subjectively desirable states that one intends to and can possibly achieve through action (Kruglanski, & Köpetz, 2009). EIT assumes emotions to be motivational states that help an individual adapt to situational demands (Brehm, 1999). EIT posits that intensity of an emotion is a function of the importance of a goal and the strength of the deterrent to that goal. The higher the importance of a goal, the stronger the motivation to achieve it under moderate to high deterrence. However, this motivation sinks when deterrence is too high to justify the effort required to overcome it. If disease salience motivates one to seek in-group affiliation, upholding the in-group's norms and ideals should be one's goal. Following this reasoning, endorsing the Sexual Assault Policy is the goal in Study 2. Commitment to feminist ideology determines the importance of the goal, while influence (pro- or anti-policy) determines the deterrent. For highly committed feminists (high importance), anti-policy social influence is a strong deterrent, and combination of the two, when disease is salient, evokes a strong motivation to endorse the policy and oppose the influence. For those who are indifferent to feminist ideology, the proposed policy holds little or no importance. Therefore, participants low on feminist ideology do not exhibit resistance to influence in either direction.

Both the theoretical accounts presented above predict that strongly-identifying feminists will oppose the anti-feminist influence in Study 2. However, I did not directly measure either group identification or the importance of the goal to curb sexual assault. The two theories make similar predictions in this case because the attitude in question is highly relevant to one's affiliation with the group (i.e., feminists). Disease salience increases this opposition by



enhancing the value of one's in-group and the importance of the group relevant goal in one's eye.

The findings of Study 3, however, were not compatible with either SCT or EIT accounts.

For Study 3, both SCT and EIT would predict (i) increased resistance of anti-policy influence among participants with strong beliefs against freedom of speech if disease were salient, and (ii) weak anti-free speech attitudes would conform to influence more when disease were salient. My findings showed no support for (i), and showed only partial support for (ii). Namely, participants with high value for religiousness exhibit equal amounts of conformity regardless of whether disease is salient or not. Disease salient participants who value religiousness little show a small (marginal) increase in conformity only to a majority that is against free speech. It appears these participants do not necessarily see the pro-policy (i.e., anti-free speech) influence coming from an out-group. Therefore, when disease threat enhances their need to seek affiliations, they conform to an anti-free-speech message just as much as highly religious participants do. Given the weak correlation of Religiousness with Approval of the policy restricting free speech, one cannot draw any conclusions about participants' commitment to free speech. Even though the reliability of this analysis is low one can reasonably conjecture these findings would have been in line with those of Study 2 if Study 3 had employed a stronger and more direct indicator of existing attitude toward freedom of speech.

Hypotheses 2 and 3 predicted the role of shame and pride as a motivational mechanism in the relationship between disease salience and conformity. I predicted shame and pride would mediate the relationship between disease salience and conformity. This follows from the position that disease threat increases conformity because it helps the individual obtain support from the in-group (Navarrete & Fessler, 2006). Correlational data from this research provides some evidence of partial mediation by shame and pride in said relationship. Experimental data from

Studies 2 and 3, however, indicates no signs of the hypothesized mediation. Even though the disease salience manipulation seemed to be affecting the mediating variables in the predicted direction (especially in Study 2), it did not amount to a partial or full mediation in neither of the experimental studies. Three possible reasons may have caused this failure.

First, shame and pride belong to a category of low visibility emotions (Scheff, 1990). These emotions are notoriously hard to elicit and measure in the laboratory, "partly because self-conscious emotions require more psychologically complex and individualized elicitors" (Tracy & Robins, 2004b, p. 104). There is a strong possibility that the single-adjective measures that I used were not adequate enough for capturing shame and pride. Future endeavors should include situation-based measures that are more robust in eliciting and measuring these emotions.

Lack of power can also be a cause of the null findings for our mediation model. The minimum recommended sample size for an SEM based model is 200 cases (Barrett, 2007) or 5 cases per parameter (Kline, 2010; Jackson, 2003; Bentler & Chou, 1987). Sample sizes in Studies 2 ( $N=242$ ) and 3 ( $N=215$ ) were nearly 70 cases per model and 3 cases per parameter estimated. Sample sizes for both Studies 2 and 3 were selected based on a priori power analysis to detect the main and interaction effects of Influence and disease salience ( $3 \times 2$ ) on conformity. No a priori power analysis was conducted for the mediation model. Post hoc power analysis showed that Studies 2 and 3 were underpowered for detecting the mediation effects of pride and shame ( $1-\beta$ s ranged from .06 to .15). Therefore, it is likely that my sample size was too small to capture the less robust mediation effects I was looking for. If that's the case, employing a larger sample for future studies will achieve adequate power to detect the mediation effects.

Finally, there is a strong likelihood that the proposed intermediary variables do not indeed mediate the relationship between disease salience and conformity. This implies that my

hypothesis regarding the role of shame and pride in motivating the effect of disease salience on conformity was invalid. In this case, the question of what motivational states underpin the effect of disease salience on conformity remains unanswered. This calls for careful examination of the literature to seek out alternate motivational states (e.g., fear, social rejection) to be explored in future research.

Failure of the mediation hypothesis calls for both theoretical and methodological improvements in future research. First, insights from current research suggest that future studies should consider other motivational mechanisms to explain the effect of disease salience on conformity. For example, fear has been shown to be a strong motivator of conformity (e.g., Darley, 1966). It is possible that disease salience may be inducing a state of fear in people, which in turn leads them to conform. Perceived social rejection is another strong motivator of conformity to the in-group (Heerdink et al., 2013; Naverrete et al., 2004) and may possibly mediate the effects of disease-salience on conformity. Thus, including fear and feelings of rejection as mediators in future research on disease threat and conformity will help investigate the nature of the motivational mechanism underlying this phenomenon.

Past work on the effects of disease salience on conformity has shown that disease salience increases conformity to majority influence (Schaller & Murray, 2012; Wu & Chang, 2012). However, those findings may only pertain to targets that are of little importance to a person or their group. Majority opinion in those situations is akin to informational influence, where people accept others' views as evidence about the state of reality (Kelman, 1958). Findings of the current research went beyond that and onto providing insights into how disease salience effects conformity to normative influence, where one changes one's behavior to seek the acceptance of one's group (Aronson, Wilson, & Akert, 2005). Especially in Study 2, I showed

that disease salience made those who strongly identified with feminist ideology go along with their in-group by showing consistent support for the in-group's norms) instead of conforming to majority of strangers who seemed to hold views contrary to their in-group's (i.e., an anti-feminist position). These findings are consistent with the notion that disease salience makes people more conforming exclusively to their in-group, which can help them secure support and coalitions in case they suffered from illness (Navarrete et al., 2004).

### **Limitations and Future Directions**

In this research, I attempted to extend the existing body of knowledge in this area by;

- i. Investigating the effects of disease salience on conformity in a variety of outcomes including important social issues
- ii. Testing the role of potential mediating variables in order to explain the process by which disease salience affects conformity

However, the findings of this research did not confirm my predictions. Current research suffered from a set of limitations that possibly resulted in shortcomings vis-a-vis my understanding of the phenomenon of interest.

1. Though, Study 1 showed partial support for the model I hypothesized, validity of its findings is limited due to its correlational nature. Shame was found to mediate, in part, the relationship between disease salience and conformity. However, I did not manipulate disease salience, and therefore, there is a possibility that the covariance between disease salience and shame was caused by a third extraneous variable that was not measured in this research. Therefore, findings of Study 1 do not suffice as evidence for mediation unless supported by experimental data.

2. The moderator in Study 3 was not adequate enough to draw a parallel between the results of Studies 2 and 3. This limitation existed because final results of Study 2 were not yet available before the design and materials were finalized for Study 3. Since, I was not fully aware of the importance of existing attitudes in the causal relationship between disease salience and conformity that I discovered from Study 2, indicators I chose to measure existing attitudes were inadequate. Future research should be designed keeping this issue in mind, i.e., variables that are strongly related to the target behavior should be included in the research design.
3. Both Studies 2 and 3 used single-item measures of shame and pride, which seemingly failed to capture much variance in the experiences of shame and pride. This could be one of the potential causes for failed mediation. Future studies should use situation-based measures of the mediating variables, which are more effective at eliciting and recording variations in low visibility emotions.
4. Studies 2 and 3 were also under-powered, which reduces my confidence in the null effects observed. This issue can be resolved in two ways. First, strengthening the manipulation of disease salience and increasing the sensitivity and accuracy of measures of shame and pride will help increase the observed effect size, which is positively associated with power. Selecting a sample size based on a priori power analysis would also increase confidence in future research.

## Chapter 6: Conclusion

These findings highlight the role of disease threat in shaping human social interactions. Previous research has shown that perceived threat of disease can make people change their actions in order to conform to a majority when those actions carry little importance (Murray & Schaller, 2012; Fincher, Thornhill, Murray, & Schaller, 2008). Existing views posit that this increase helps people adopt behaviors that can be beneficial in averting disease (Murray, Trudeau, & Schaller, 2011). Findings of my research do not support this view, and instead, suggest that disease salience only increases conformity to norms espoused by one's valued in-group.

Results of this research particularly highlight that disease threat can indeed evoke resistance to majority influence when said influence is perceived as originating from a relevant out-group. These findings are not consistent with my original hypotheses. Instead, they do suggest an alternative view that conformity arising out of disease threat is heavily dependent on where one's in-group stands on a particular issue, and that, when threatened with disease, people resist normative influence that is contrary to their in-group's positions.

This would mean that, in real life situations, people living under high disease threat are more susceptible to conforming to their in-group's standards. When the pressure to conform is high, norms and standards can gradually become extreme. When group affiliation is in high demand, the price one has to pay for it can be on a constant hike. This gradual increase can lead to polarization in a group's attitudes, beliefs, and practices. This analysis partially explains why societies that are ridden with disease and have poor healthcare and sanitation facilities espouse stronger norms, harsher punishment for deviance (e.g., Gelfand et al., 2011), extreme ideologies, and overall societal polarization.

## References

- Abrams, D., Wetherell, M., Cochrane, S., Hogg, M. A., & Turner, J. C. (1990). Knowing what to think by knowing who you are: Self-categorization and the nature of norm formation, conformity and group polarization. *British Journal of Social Psychology*, 29(2), 97-119
- Ackerman, J. M., Vaughn Becker, D., Mortensen, C. R., Sasaki, T., Neuberg, S. L., & Kenrick, D. T. (2009). A pox on the mind: Disjunction of attention and memory in the processing of physical disfigurement. *Journal of Experimental Social Psychology*, 45(3), 478-485.
- Aramovich, N. P., Lytle, B. L., & Skitka, L. J. (2012). Opposing torture: Moral conviction and resistance to majority influence. *Social Influence*, 7(1), 21-34.
- Asch, S. E. (1956). Studies of independence and conformity: I. A minority of one against a unanimous majority. *Psychological Monographs: General and Applied*, 70(9), 1-70. doi: <http://dx.doi.org/10.1037/h0093718>
- Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Personality and Individual Differences*, 42, 815–824.
- Bartram, J., & Cairncross, S. (2010). Hygiene, sanitation, and water: forgotten foundations of health. *PLoS Med*, 7(11), e1000367
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497-529. doi: 10.1037/0033-2909.117.3.497
- Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Twenge, J. M. (2005). Social Exclusion Impairs Self-Regulation. *Journal of Personality and Social Psychology*, 88(4), 589-604. doi: <http://dx.doi.org/10.1037/0022-3514.88.4.589>

- Bentler, P. M., & Chou, C. P. (1987) Practical issues in structural modeling. *Sociological Methods & Research*, 16, 78-117.
- Blanchard, F. A., Crandall, C. S., Brigham, J. C., & Vaughn, L. A. (1994). Condemning and condoning racism: A social context approach to interracial settings. *Journal of Applied Psychology*, 79(6), 993
- Brehm, J. W. (1999). The intensity of emotion. *Personality and Social Psychology Review*, 3(1), 2-22.
- Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and Social Psychology Review*, 14(2), 155-195.
- Buss, D. M. (1990). The evolution of anxiety and social exclusion. *Journal of Social and Clinical Psychology*, 9(2), 196-201. doi: 10.1521/jscp.1990.9.2.196
- Cialdini, R. B., & Goldstein, N. J. (2004). Social Influence: Compliance and Conformity. *Annual Review of Psychology*, 55(1), 591-621. doi:10.1146/annurev.psych.55.090902.142015
- Cohen, T. R., Wolf, S. T., Panter, A. T., & Insko, C. A. (2011). Introducing the GASP scale: a new measure of guilt and shame proneness. *Journal of Personality & Social Psychology*, 100(5), 947-966. doi: 10.1037/a0022641
- Cosmides, L., & Tooby, J. (1994). Origins of domain specificity: The evolution of functional organization. *Mapping the mind: Domain specificity in cognition and culture*, 85-116.
- Curtis, V., Aunger, R., & Rabie, T. (2004). Evidence that disgust evolved to protect from risk of disease. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, 271(Suppl 4), S131-S133.



- Darley, J. M. (1966). Fear and social comparison as determinants of conformity behavior. *Journal of Personality and Social Psychology*, 4(1), 73.
- Duncan, L. A., Schaller, M., & Park, J. H. (2009). Perceived vulnerability to disease: Development and validation of a 15-item self-report instrument. *Personality and Individual Differences*, 47(6), 541-546.
- Ebert, D., & Hamilton, W. D. (1996). Sex against virulence: the coevolution of parasitic diseases. *Trends in Ecology & Evolution*, 11(2), 79-82. doi: [http://dx.doi.org/10.1016/0169-5347\(96\)81047-0](http://dx.doi.org/10.1016/0169-5347(96)81047-0)
- Faulkner, J., Schaller, M., Park, J. H., & Duncan, L. A. (2004). Evolved disease-avoidance mechanisms and contemporary xenophobic attitudes. *Group Processes & Intergroup Relations*, 7(4), 333-353.
- Fessler, D. M. T. (2007). From appeasement to conformity: Evolutionary and cultural perspectives on shame, competition, and cooperation. *The Self-conscious Emotions: Theory and Research*. (pp. 174-193): Guilford Press, New York, NY.
- Fessler, D. M., Eng, S. J., & Navarrete, C. D. (2005). Elevated disgust sensitivity in the first trimester of pregnancy: Evidence supporting the compensatory prophylaxis hypothesis. *Evolution and Human Behavior*, 26(4), 344-351. doi: <http://dx.doi.org/10.1016/j.evolhumbehav.2004.12.001>
- Festinger, L., Gerard, H. B., Hymovitch, B., Kelley, H. H., & Raven, B. (1952). The influence process in the presence of extreme deviates. *Human Relations*, 5, 327-346. doi: 10.1177/001872675200500402
- Fincher, C. L., & Thornhill, R. (2012). The parasite-stress theory may be a general theory of culture and sociality. *Behavioral & Brain Sciences*, 35(2), 99-119.

- Fincher, C. L., Thornhill, R., Murray, D. R., & Schaller, M. (2008). Pathogen prevalence predicts human cross-cultural variability in individualism/collectivism. *Proceedings of the Royal Society B: Biological Sciences*, 275(1640), 1279-1285. doi: 10.1098/rspb.2008.0094
- Fleischman, D. S., & Fessler, D. M. (2011). Progesterone's effects on the psychology of disease avoidance: Support for the compensatory behavioral prophylaxis hypothesis. *Hormones and Behavior*, 59(2), 271-275.
- Fuegen, K., & Brehm, J. W. (2004). The intensity of affect and resistance to social influence. *Resistance and Persuasion*, 39-64.
- Gelfand, M. J., Raver, J. L., Nishii, L., Leslie, L. M., Lun, J., Lim, B. C., Arnadottir, J. (2011). Differences between tight and loose cultures: A 33-nation study. *Science*, 332(6033), 1100-1104.
- Goldberg, L. R., Johnson, J. A., Eber, H. W., Hogan, R., Ashton, M. C., Cloninger, C. R., & Gough, H. C. (2006). The International Personality Item Pool and the future of public-domain personality measures. *Journal of Research in Personality*, 40, 84-96.
- Griskevicius, V., Goldstein, N. J., Mortensen, C. R., Cialdini, R. B., & Kenrick, D. T. (2006). Going along versus going alone: When fundamental motives facilitate strategic (non)conformity. *Journal of Personality and Social Psychology*, 91(2), 281-294. doi: <http://dx.doi.org/10.1037/0022-3514.91.2.281>
- Haensch, S., Bianucci, R., Signoli, M., Rajerison, M., Schultz, M., Kacki, S., ... Bramanti, B. (2010). Distinct clones of *Yersinia Pestis* caused the Black Death. *PLoS Pathogens*, 6(10), e1001134. doi:10.1371/journal.ppat.1001134
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, 76, 408-420.

- Heerdink, M. W., Van Kleef, G. A., Homan, A. C., & Fischer, A. H. (2013). On the social influence of emotions in groups: Interpersonal effects of anger and happiness on conformity versus deviance. *Journal of Personality & Social Psychology*, 105(2):262-84. doi: 10.1037/a0033362.
- Hillis, W. D. (1990). Co-evolving parasites improve simulated evolution as an optimization procedure. *Physica D: Nonlinear Phenomena*, 42(1-3), 228-234. doi: [http://dx.doi.org/10.1016/0167-2789\(90\)90076-2](http://dx.doi.org/10.1016/0167-2789(90)90076-2)
- Hogg, M. A., & Hardie, E. A. (1992). Prototypicality, conformity and depersonalized attraction: A self-categorization analysis of group cohesiveness. *British Journal of Social Psychology*, 31(1), 41-56.
- Hogg, M. A., CooperShaw, L., & Holzworth, D. W. (1993). Group prototypically and depersonalized attraction in small interactive groups. *Personality and Social Psychology Bulletin*, 19(4), 452-465.
- Hollander, E. P. (1958). Conformity, status, and idiosyncrasy credit. *Psychological review*, 65(2), 117.
- Imhoff, R., & Erb, H. P. (2009). What motivates nonconformity? Uniqueness seeking blocks majority influence. *Personality and Social Psychology Bulletin*, 35(3), 309-320.
- Inbar, Y., Pizarro, D. A., & Bloom, P. (2009). Conservatives are more easily disgusted than liberals. *Cognition and Emotion*, 23(4), 714-725.
- Jackson, D. L. (2003). Revisiting sample size and number of parameter estimates: Some support for the  $N:q$  hypothesis. *Structural Equation Modeling*, 10, 128-141.

- Jacobson, R. P., Mortensen, C. R., & Cialdini, R. B. (2011). Bodies obliged and unbound: Differentiated response tendencies for injunctive and descriptive social norms. *Journal of Personality and Social Psychology*, 100(3), 433-448. doi: <http://dx.doi.org/10.1037/a0021470>
- Jetten, J., Postmes, T., & McAuliffe, B. J. (2002). 'We're all individuals': group norms of individualism and collectivism, levels of identification and identity threat. *European Journal of Social Psychology*, 32(2), 189-207. doi: 10.1002/ejsp.65
- Kelley, H. H. (1955). Salience of membership and resistance to change of group-centered attitudes. *Human Relations*.
- Kelley, H. H., & Lamb, T. W. (1957). Certainty of judgment and resistance to social influence. *The Journal of Abnormal and Social Psychology*, 55(1), 137.
- Kelley, H. H., & Volkart, E. H.. (1952). The Resistance to Change of Group-Anchored Attitudes. *American Sociological Review*, 17(4), 453-465. Retrieved from <http://www.jstor.org/stable/2088001>
- Kline, R.B. (2010). *Principles and Practice of Structural Equation Modeling* (3rd ed.). New York: Guilford Press.
- Kurzban, R., & Leary, M. R. (2001). Evolutionary origins of stigmatization: the functions of social exclusion. *Psychological Bulletin*, 127(2), 187.
- Lakin, J. L., & Chartrand, T. L. (2003). Using Nonconscious Behavioral Mimicry to Create Affiliation and Rapport. *Psychological Science*, 14(4), 334-339. doi: 10.1111/1467-9280.14481

- Lakin, J. L., Chartrand, T. L., & Arkin, R. M. (2008). I Am Too Just Like You: Nonconscious Mimicry as an Automatic Behavioral Response to Social Exclusion. *Psychological Science*, 19(8), 816-822. doi: 10.1111/j.1467-9280.2008.02162.x
- Lakin, J., Jefferis, V., Cheng, C., & Chartrand, T. (2003). The Chameleon Effect as Social Glue: Evidence for the Evolutionary Significance of Nonconscious Mimicry. *Journal of Nonverbal Behavior*, 27(3), 145-162. doi: 10.1023/A:1025389814290
- Lambe, J. L. (2008). The structure of censorship attitudes. *Communication Law and Policy*, 13(4), 485-506.
- Lewis, M., Alessandri, S. M., & Sullivan, M. W. (1992). Differences in shame and pride as a function of children's gender and task difficulty. *Child development*, 63(3), 630-638.
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation Analysis. *Annual Review of Psychology*, 58, 593. doi:10.1146/annurev.psych.58.110405.085542
- Marques, J. M., & Paez, D. (1994). The 'black sheep effect': Social categorization, rejection of ingroup deviates, and perception of group variability. *European Review of Social Psychology*, 5(1), 37-68.
- McGarty, C., Haslam, S. A., Hutchinson, K. J., & Turner, J. C. (1994). The effects of salient group memberships on persuasion. *Small Group Research*, 25(2), 267-293.
- Morgan, B. L. (1996). Putting the feminism into feminism scales: Introduction of a Liberal Feminist Attitude and Ideology Scale (LFAIS). *Sex Roles*, 34(5-6), 359-390.
- Moscovici, S., & Zavalloni, M. (1969). The group as a polarizer of attitudes. *Journal of personality and social psychology*, 12(2), 125.

- Murray, D. R., & Schaller, M. (2010). Historical prevalence of infectious diseases within 230 geopolitical regions: A tool for investigating origins of culture. *Journal of Cross-Cultural Psychology*, 41(1), 99-108.
- Murray, D. R., & Schaller, M. (2012). Threat (s) and conformity deconstructed: Perceived threat of infectious disease and its implications for conformist attitudes and behavior. *European Journal of Social Psychology*, 42(2), 180-188.
- Murray, D. R., Trudeau, R., & Schaller, M. (2011). On the origins of cultural differences in conformity: Four tests of the pathogen prevalence hypothesis. *Personality and Social Psychology Bulletin*, 37(3), 318-329.
- Navarrete, C. D., & Fessler, D. M. (2005). Normative bias and adaptive challenges: A relational approach to coalitional psychology and a critique of terror management theory. *Evolutionary Psychology*, 3, 297-325.
- Navarrete, C. D., & Fessler, D. M. (2006). Disease avoidance and ethnocentrism: The effects of disease vulnerability and disgust sensitivity on intergroup attitudes. *Evolution and Human Behavior*, 27(4), 270-282.
- Navarrete, C. D., Fessler, D. M., & Eng, S. J. (2007). Elevated ethnocentrism in the first trimester of pregnancy. *Evolution and Human Behavior*, 28(1), 60-65.
- Navarrete, C. D., Kurzban, R., Fessler, D. M., & Kirkpatrick, L. A. (2004). Anxiety and Intergroup Bias: Terror Management or Coalitional Psychology? *Group Processes & Intergroup Relations*.
- Neuberg, S. L., Kenrick, D. T., & Schaller, M. (2011). Human threat management systems: Self-protection and disease avoidance. *Neuroscience & Biobehavioral Reviews*, 35(4), 1042-1051.

- Olatunji, B. O., Williams, N. L., Tolin, D. F., Abramowitz, J. S., Sawchuk, C. N., Lohr, J. M., & Elwood, L. S. (2007). The Disgust Scale: Item analysis, factor structure, and suggestions for refinement. *Psychological Assessment, 19*(3), 281-297. doi: 10.1037/1040-3590.19.3.281
- Park, J. H., Schaller, M., & Crandall, C. S. (2007). Pathogen-avoidance mechanisms and the stigmatization of obese people. *Evolution and Human Behavior, 28*(6), 410-414.
- Phelan, J. C., Link, B. G., & Dovidio, J. F. (2008). Stigma and prejudice: one animal or two? *Social Science & Medicine, 67*(3), 358-367.
- Pool, G. J., & Schwegler, A. F. (2007). Differentiating among motives for norm conformity. *Basic and Applied Social Psychology, 29*(1), 47-60
- Prüss, A., Kay, D., Fewtrell, L., & Bartram, J. (2002). Estimating the burden of disease from water, sanitation, and hygiene at a global level. *Environmental Health Perspectives, 110*(5), 537-542.
- Pyszczynski, T., Greenberg, J., Solomon, S., Arndt, J., & Schimel, J. (2004). Why Do People Need Self-Esteem? A Theoretical and Empirical Review. *Psychological Bulletin, 130*(3), 435-468. doi: 10.1037/0033-2909.130.3.435
- Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological Review, 94*(1), 23.
- Sabath, G. (1964). The effect of disruption and individual status on person perception and group attraction. *The Journal of Social Psychology, 64*(1), 119-130.
- Schaller, M. (2006). Parasites, behavioral defenses, and the social psychological mechanisms through which cultures are evoked. *Psychological Inquiry, 17*(2), 96-137.

- Schaller, M. (2011). The behavioural immune system and the psychology of human sociality. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 366(1583), 3418–3426. doi:10.1098/rstb.2011.0029
- Schaller, M., & Duncan, L. A. (2007). The behavioral immune system: Its evolution and social psychological implications. In J. P. Forgas, M. G. Haselton, & W. von Hippel (Eds.), *Evolution and the Social Mind: Evolutionary Psychology and Social Cognition* (pp. 293-307). New York: Psychology Press.
- Schaller, M., & Park, J. H. (2011). The behavioral immune system (and why it matters). *Current Directions in Psychological Science*, 20(2), 99-103.
- Scheff, T. J. (1988). Shame and Conformity: The Deference-Emotion System. *American Sociological Review*, 53(3), 395.
- Scheff, T. J. (1990). Socialization of emotions: Pride and shame as causal agents. *Research Agendas in the Sociology of Emotions*, 281-304.
- Sherif, M. (1936). *The Psychology of Social Norms*. Oxford, England: Harper.
- Sherif, M. (1966). In *Common Predicament: Social Psychology of Intergroup Conflict and Cooperation*. Boston: Houghton Mifflin Company.
- Skitka, L. J., Bauman, C. W., & Sargis, E. G. (2005). Moral conviction: Another contributor to attitude strength or something more?. *Journal of Personality and Social Psychology*, 88(6), 895.
- Tangney, J. P., Miller, R. S., Flicker, L., & Barlow, D. H. (1996). Are shame, guilt, and embarrassment distinct emotions?. *Journal of personality and social psychology*, 70(6), 1256.



- Taubenberger, J. K., & Morens, D. M. (2006). 1918 Influenza: the mother of all pandemics. *Revista Biomedica*, 17, 69-79.
- Terrizzi, J. A., Shook, N. J., & McDaniel, M. A. (2013). The behavioral immune system and social conservatism: A meta-analysis. *Evolution and Human Behavior*, 34(2), 99-108.
- Thornhill, R., Fincher, C. L., & Aran, D. (2009). Parasites, democratization, and the liberalization of values across contemporary countries. *Biological Reviews*, 84(1), 113-131. doi: 10.1111/j.1469-185X.2008.00062.x
- Thornhill, R., Fincher, C. L., Murray, D. R., & Schaller, M. (2010). Zoonotic and non-zoonotic diseases in relation to human personality and societal values: support for the parasite-stress model. *Evolutionary Psychology*, 8(2), 151-169.
- Tracy, J. L., & Robins, R. W. (2004a). Show Your Pride: Evidence for a Discrete Emotion Expression. *Psychological Science*, 15(3), 194-197. doi: 10.1111/j.0956-7976.2004.01503008.x
- Tracy, J. L., & Robins, R. W. (2004b). Putting the Self Into Self-Conscious Emotions: A Theoretical Model. *Psychological Inquiry*, 15(2), 103-125.
- Tracy, J. L., & Robins, R. W. (2007a). Emerging Insights Into the Nature and Function of Pride. *Current Directions in Psychological Science*, 16(3), 147-150. doi: 10.1111/j.1467-8721.2007.00493.x
- Tracy, J. L., & Robins, R. W. (2007b). The psychological structure of pride: A tale of two facets. *Journal of Personality and Social Psychology*, 92(3), 506-525. doi: <http://dx.doi.org/10.1037/0022-3514.92.3.506>
- Turner, J. C. (1991). *Social influence*. Thomson Brooks/Cole Publishing Co.

- Van Blerkom, L. M. (2003). Role of viruses in human evolution. *American Journal of Physical Anthropology*, 122(S37), 14-46. doi: 10.1002/ajpa.10384
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063.
- Wheatley, T., & Haidt, J. (2005). Hypnotic disgust makes moral judgments more severe. *Psychological Science*, 16(10), 780-784.
- Wolfe, N. D., Dunavan, C. P., & Diamond, J. (2007). Origins of major human infectious diseases. *Nature*, 447(7142), 279-283. doi:  
[http://www.nature.com/nature/journal/v447/n7142/supinfo/nature05775\\_S1.html](http://www.nature.com/nature/journal/v447/n7142/supinfo/nature05775_S1.html)
- Wu, B. P., & Chang, L. (2012). The social impact of pathogen threat: How disease salience influences conformity. *Personality and Individual Differences*, 53(1), 50-54.

## Tables

Table 1

*Correlation Analysis in Study 1 Shows that PVD, Disgust, and Shame were Positively Related with Measures of Conformity, whereas Pride was Correlated Positively with Conformist Values but Negatively with Conformity Scale (n=239)*

	1	2	3	4	5	6	7	8	9	$\alpha$
Perceived Infectability										.90
Germ Aversion	-.03									.79
Core Disgust	.07	.13*								.76
Animal Disgust	.11	.13*	.68**							.68
Contamination Disgust	-.10	.31**	.24**	.19**						.51
Shame NSE	.11	.01	.01	.13*	-.07					.76
Shame Withdrawal	.24**	.13*	.16*	.20**	.19**	.05				.74
Pride	-.11	.11	.01	.07	.08	-.04	.02			.91
Conformist Values	-.03	.23**	.16*	.27**	.20**	.01	.29**	.16*		.81
Conformity Scale	.02	.10	.15*	.28**	.02	.25**	.21**	-.27**	.18**	.78

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 2

*Animal Disgust Predicted both Conformity Scale and Conformist Values, whereas Germ Aversion Predicted Conformist Values in Study 1 (n=239)*

Predictor	Conformity Scale		Conformist Values	
	$\beta$	$p$	$\beta$	$p$
Perceived Infectability	-.02	.812	-.03	.581
Germ Aversion	.08	.226	<b>.17</b>	.007
Core Disgust	-.07	.422	-.08	.324
Contamination Disgust	-.05	.478	.11	.103
Animal Disgust	<b>.32</b>	.001	<b>.29</b>	.001
<i>Adj. R<sup>2</sup></i>	.07		.11	

Table 3

*Results of Multiple Mediation Analysis (Figure 3) Testing the Intermediary Role of Shame and Pride in the Relationship between Chronic Disease Salience and Conformity Scale in Study 1 (n=239)*

Effect	Shame- Withdrawal		Shame-NSE		Pride		Conformity Scale	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
<i>Direct</i>								
Perceived Infectability	.25	.001	.08	.182	-.11	.077	-.11	.083
Germ Aversion	.07	.288	.02	.776	.09	.231	.09	.129
Contamination Disgust	.17	.012	-.10	.207	.03	.644	-.06	.337
Animal Disgust	.13	.067	.14	.037	.06	.381	.25	.001
Shame Withdrawal							.19	.008
Shame-NSE							.20	.001
Pride							-.30	.001
<i>Indirect</i>								
Perceived Infectability							.10	.001
Germ Aversion							-.01	.735
Contamination Disgust							.00	.886
Animal Disgust							.03	.294

$\chi^2(2, N=239)=.387, p = .824, CFI=1.0, TLI=1.18, RMSEA=.000$

Table 4

*Results of Multiple Mediation Analysis (Figure 4) Testing the Intermediary Role of Shame and Pride in the Relationship between Chronic Disease Salience and Conformist Values in Study 1 (n=239)*

Effect	Shame- Withdrawal		Pride		Conformist Values	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
<i>Direct</i>						
Perceived Infectability	.25	.001	-.11	.077	-.08	.228
Germ Aversion	.07	.288	.09	.231	.15	.019
Contamination Disgust	.17	.012	.03	.644	.05	.460
Animal Disgust	.13	.067	.06	.381	.20	.004
Shame- Withdrawal					.24	.001
Pride					.11	.058
<i>Indirect</i>						
Perceived Infectability					.05	.035
Germ Aversion					.03	.124
Contamination Disgust					.04	.015
Animal Disgust					.04	.081

$\chi^2(1, N=239)=.10, p = .75, CFI=1.0, TLI=1.18, RMSEA=.000$

Table 5

*Observed Means and Standard Deviations of Approval for Policy against Sexual Assault under Conditions of Disease Salience and Influence in Study 2 (n=242)*

Influence	Disease Salience						Total		
	Deer			Flu					
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Anti	3.05	1	40	3.32	1.40	42	3.19	1.22	82
Neutral	4.52	.74	30	4.45	.89	52	4.48	.83	82
Pro	5.22	1.07	35	5.28	1.13	43	5.25	1.10	78
Total	4.19	1.34	105	4.37	1.38	137	4.29	1.36	242

Table 6

*Observed Means and Standard Deviations of Feminist Ideology, Shame, Pride, and Disgust under Conditions of Disease Salience and Influence in Study 2 (n=242)*

	Influence						Disease Salience					
	Anti		Neutral		Pro		Deer		Flu		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Feminist Ideology	4.86	.73	4.92	.70	4.91	.78	4.94	.74	4.86	.73	4.90	.73
Shame	1.29	.72	1.32	1.0 0	1.29	.71	1.19	.56	1.40	.84	1.30	.72
Pride	3.04	.98	3.21	1.0 4	3.01	1.0 3	3.13	.85	3.05	1.1 5	3.09	1.0 1
Disgust	1.35	.82	1.21	.55	1.30	.76	1.22	.61	1.35	.80	1.29	.72



Table 7

*Correlation Analysis in Study 2 Shows Feminist Ideology Remained a Significant Predictor of Approval of Sexual Assault Policy after Controlling for Influence (n=288)*

	Age	Sex	Ashamed	Proud	Disgusted	Approval of Policy	Feminist Ideology	Approval (controlling for influence)
Disease Salience	.06	.04	.15*	-.03	.08	.02	-.05	.02
Influence	.07	.01	-.00	-.01	-.02	.60**	.02	.00
Approval of Policy	.09	.21**	.02	.01	-.07			
Feminist Ideology	-.01	.40**	-.09	-.15**	-.02	.29**		
Approval (controlling for influence)	.07	.25**	.03	.01	-.07	.80**	.35**	

\* $p < .05$ , \*\* $p < .01$ .

Table 8

*Results of GLM Testing the Effects of Influence, Disease Salience, and Feminist Ideology on Approval for Sexual Assault Policy in Study 2 Found Feminist Ideology Moderates the 2-way Effect of Disease Salience and Influence on Approval of Sexual Assault Policy (n=242)*

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Influence	14.82	2	7.41	7.56	.001	.06
Disease Salience	.32	1	.32	<1	.569	.00
Influence x Disease	6.43	2	3.22	3.28	.039	.03
Feminist Ideology	33.44	1	33.44	34.12	.000	.13
Influence x Feminist Ideology	4.19	2	2.10	2.14	.120	.02
Disease x Feminist Ideology	.55	1	.55	<1	.453	.00
Influence x Disease x Feminist Ideology	7.28	2	3.64	3.72	.026	.03
Error	225.47	230	.98			

*Adj. R<sup>2</sup> = .47.*

Table 9

*Correlation Analysis in Study 3 Shows that Religiousness Remained Significantly Correlated with Approval of Social Media Policy after Controlling for Influence (n=248)*

	Age	Sex	ashamed	proud	disgusted	Approval	Religious	Approval (controlling for influence)
Disease Salience	.05	-.12	-.01	.06	.15*	.04	-.02	.02
Influence	.02	.10	-.09	-.04	-.17*	.66**	.06	.00
Approval of Policy	-.07	.12	-.11	.12	-.07	—	.15*	.76**
Religiousness	-.10	.19**	-.05	.10	.04	.15*	—	.15*
Approval (controlling for influence)	-.11	.07	-.06	.19**	.05	.76**	.15*	—

\* $p < .05$ , \*\* $p < .01$ .

Table 10

*Observed Means and Standard Deviations of Approval of Policy against Free Speech under Conditions of Disease Salience and Influence in Study 3 (n=215).*

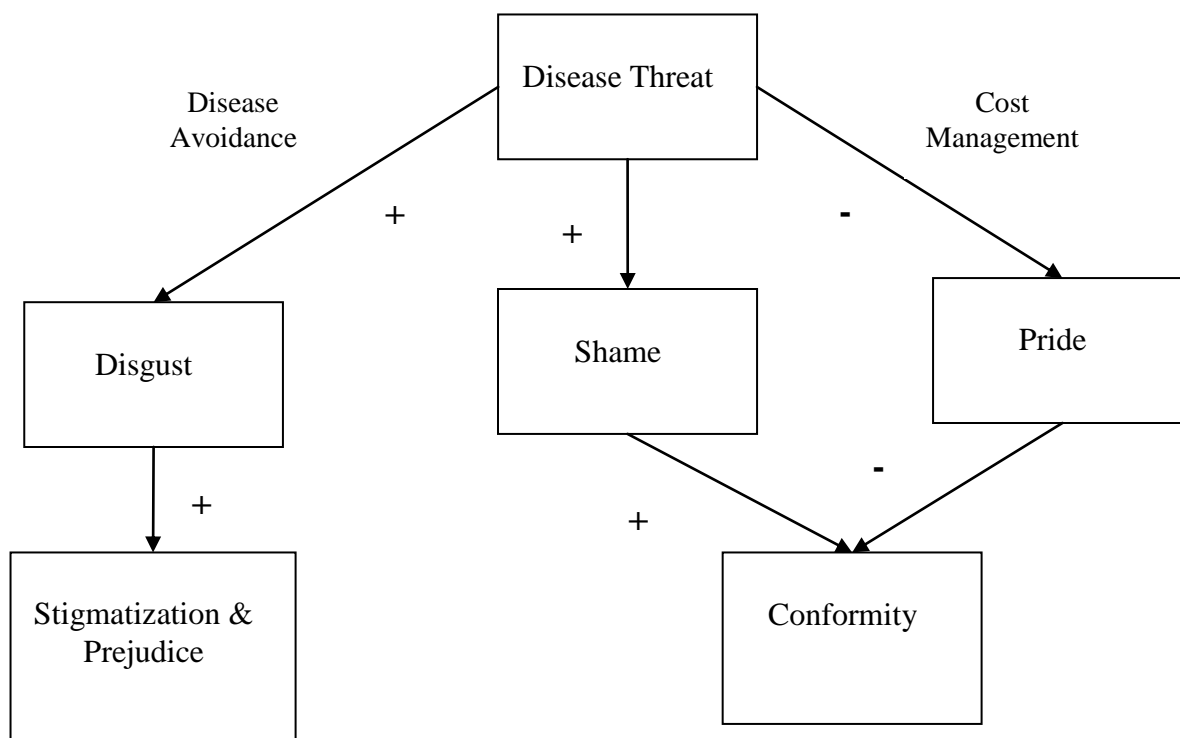
Influence	Salience						Total		
	Deer			Disease					
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Anti	2.55	.77	37	2.55	.97	34	2.55	.87	71
Neutral	3.75	.87	33	3.60	.90	38	3.67	.88	71
Pro	4.50	1.17	35	4.76	1.21	38	4.64	1.19	73
Total	3.58	1.25	105	3.68	1.37	110	3.63	1.31	215

Table 11

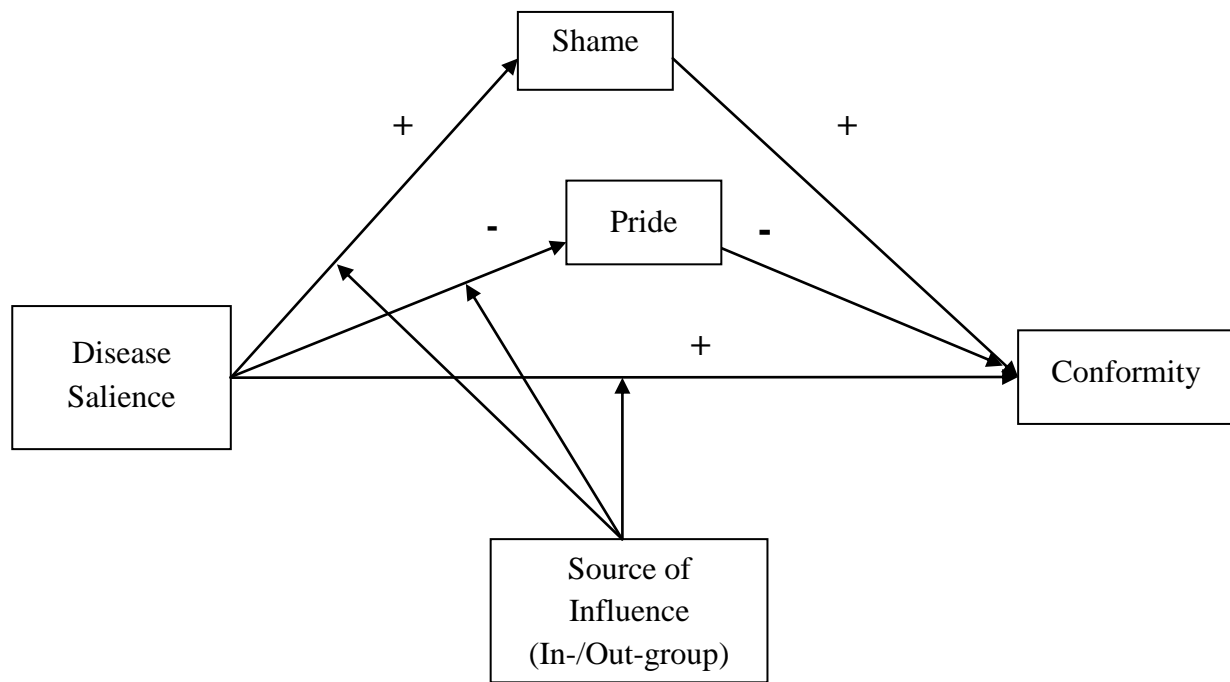
*Results of GLM Testing the effects of Influence, Disease Salience, and Religiousness on Approval of Policy Against Free Speech found main effects of Influence and Religiousness, an interaction between Salience and Influence, and Marginal 3-way interaction (n=215).*

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Influence	17.06	2	8.53	8.99	.000	.08
Disease Salience	.09	1	.09	<1	.755	.00
Influence x Disease Salience						
Salience	6.55	2	3.28	3.45	.034	.03
Religiousness	4.40	1	4.40	4.64	.032	.02
Influence x Religiousness						
Religiousness	.39	1	.39	<1	.524	.00
Disease x Religiousness						
Religiousness	4.10	2	2.05	2.16	.118	.02
Influence x Disease x Religiousness						
Religiousness	5.58	2	2.79	2.94	.055	.03
Error	192.60	203	.95			

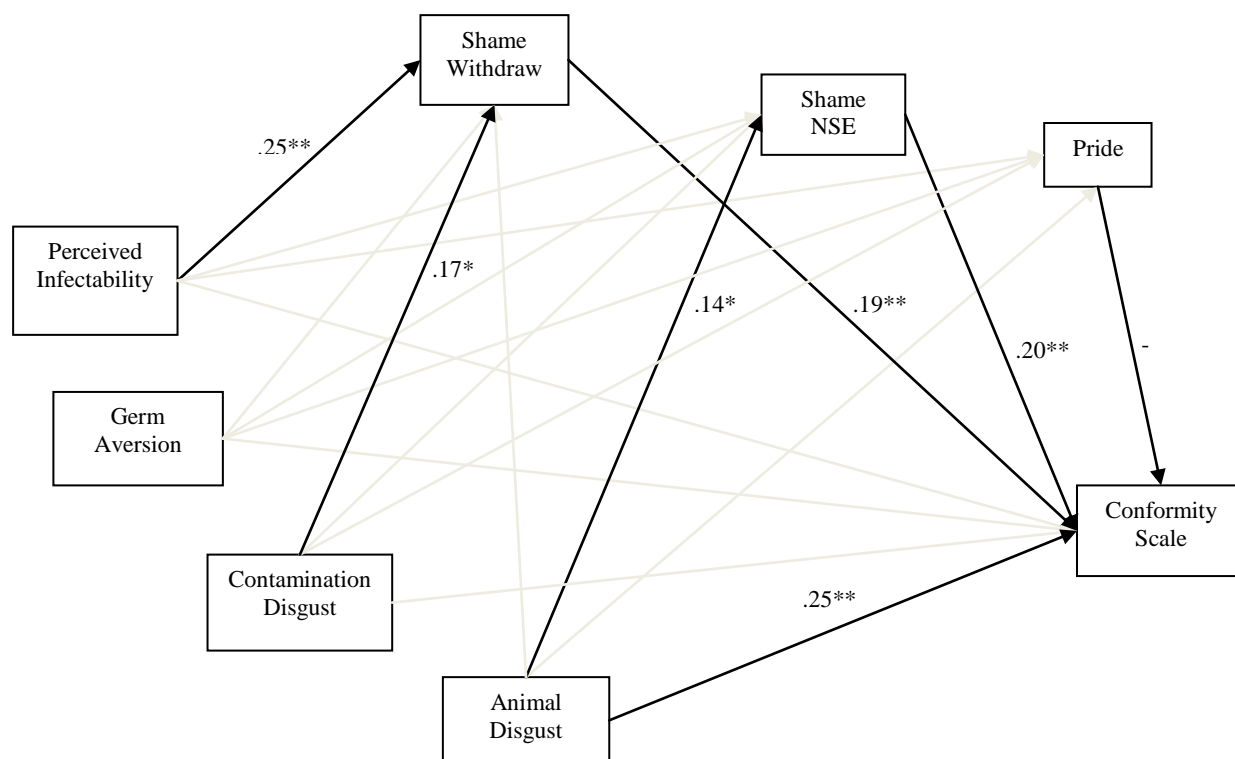
*Adj. R<sup>2</sup> = .45.*

**Figures**

*Figure 1.* Theoretical model depicting the dual effects of disease threat on sociality. The model posits two distinct processes lead to out-group avoidance and in-group approach tendencies.

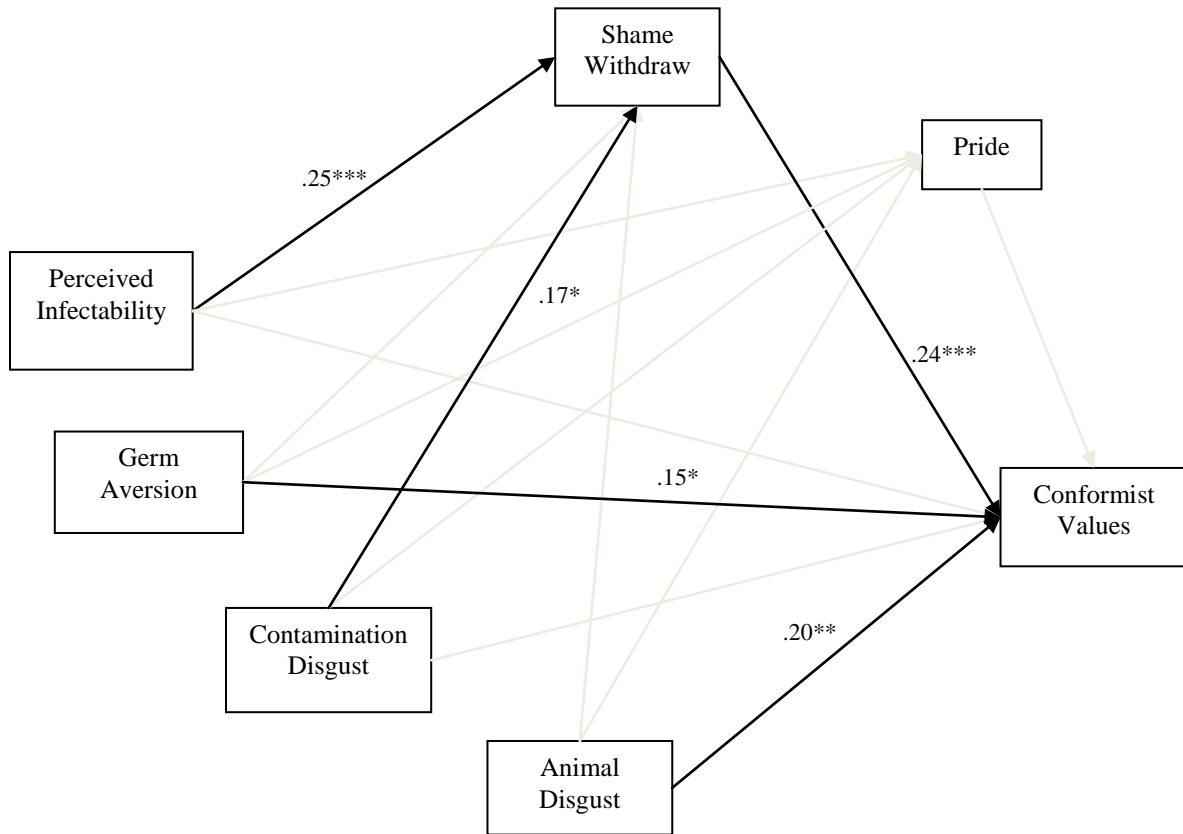


*Figure 2.* Model Depicting the Expected Effects of Interaction between Disease Salience and Existing Attitudes on Shame, Pride, and Conformity in Studies 2 & 3. Influence from the In-group will Enhance the Effects of Disease Salience on Shame, Pride, and Conformity, whereas that from the Out-group will Mitigate those Effects.



*Figure 3.* Multiple mediation model predicting scores on Conformity Scale from indicators of Chronic Disease Salience ( $n=239$ ).





*Figure 4.* Multiple mediation model predicting Scores on Conformity Values from indicators of Chronic Disease Salience in Study 1 ( $n=239$ ).

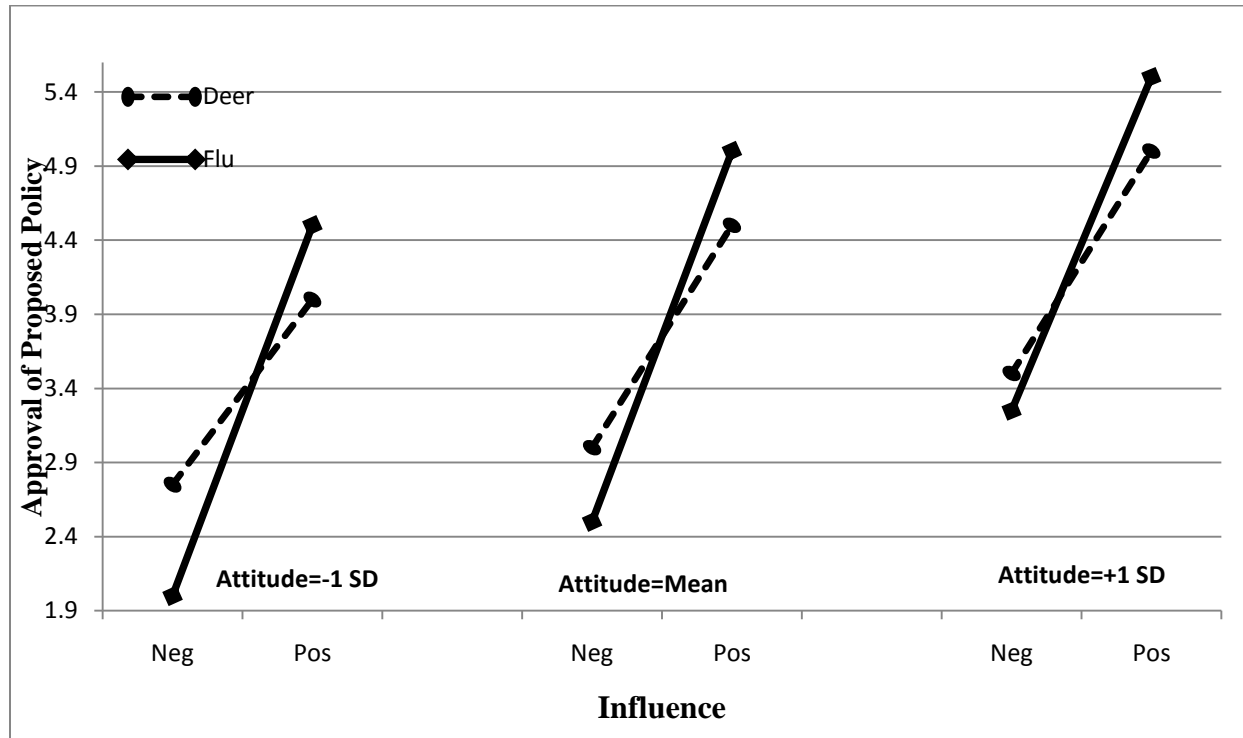


Figure 5. Expected Patterns of the Estimated Marginal Means of Approval of Proposed Policy at 3 levels of Influence and 2 Conditions of Disease Salience in Studies 2 & 3.

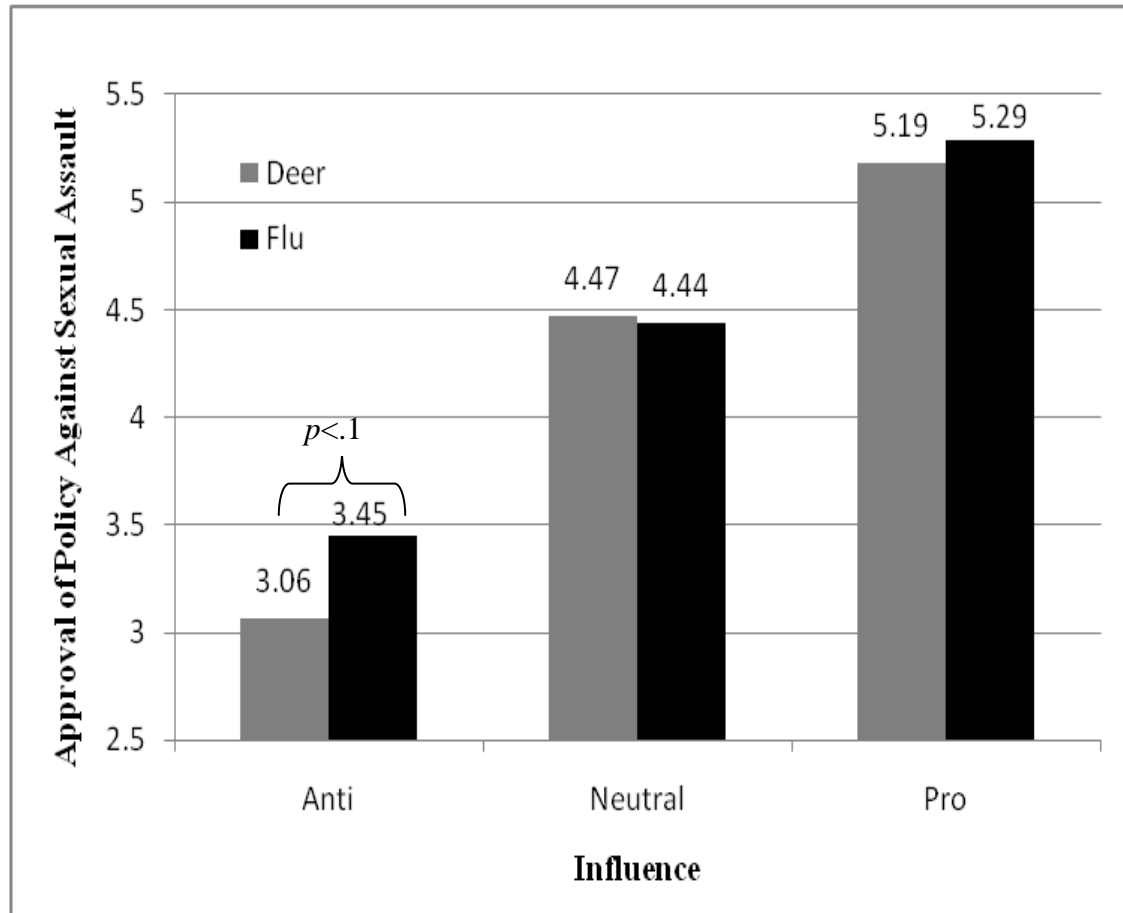


Figure 6. Estimated Marginal Means of Approval of sexual assault policy at 3 levels of Influence and 2 Conditions of Disease Salience ( $n = 242$ ).

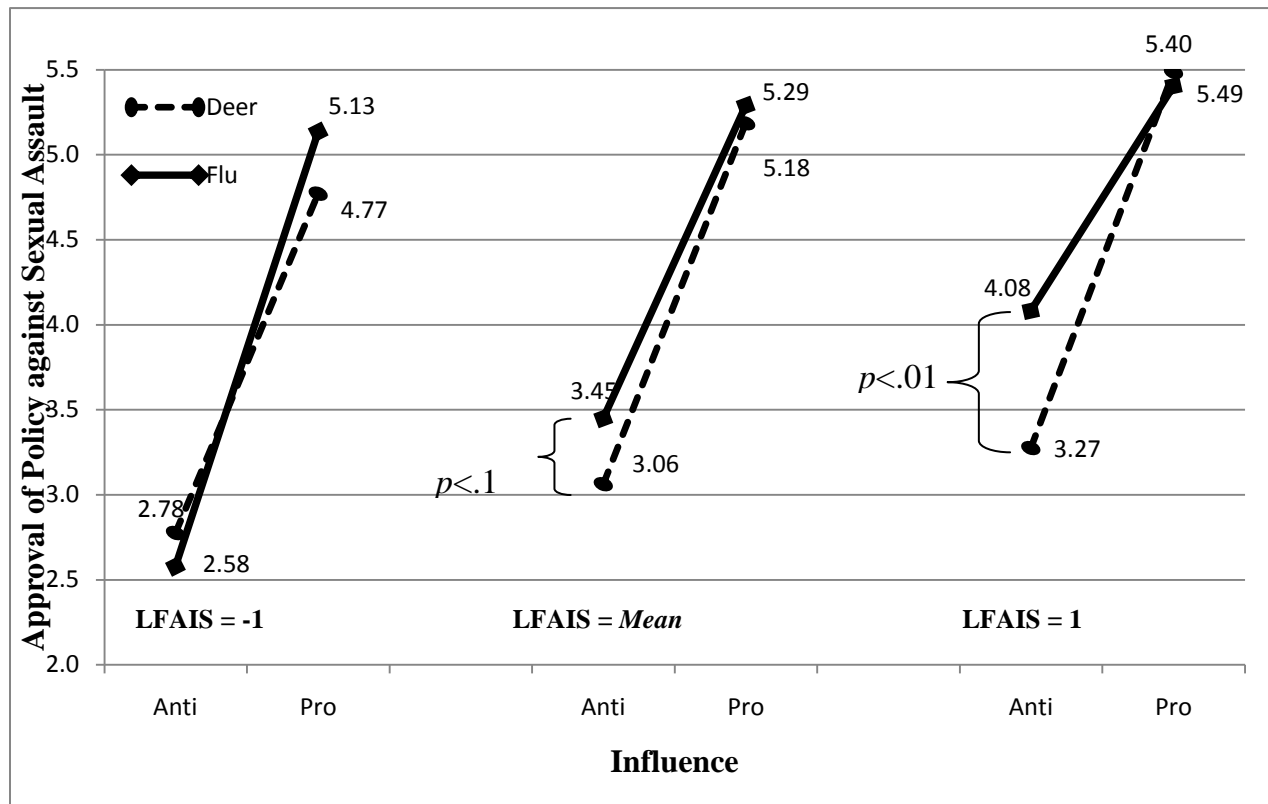


Figure 7. Effects of Disease-salience and Influence on the Approval of sexual assault policy at three levels of Feminist Ideology ( $n = 242$ ).

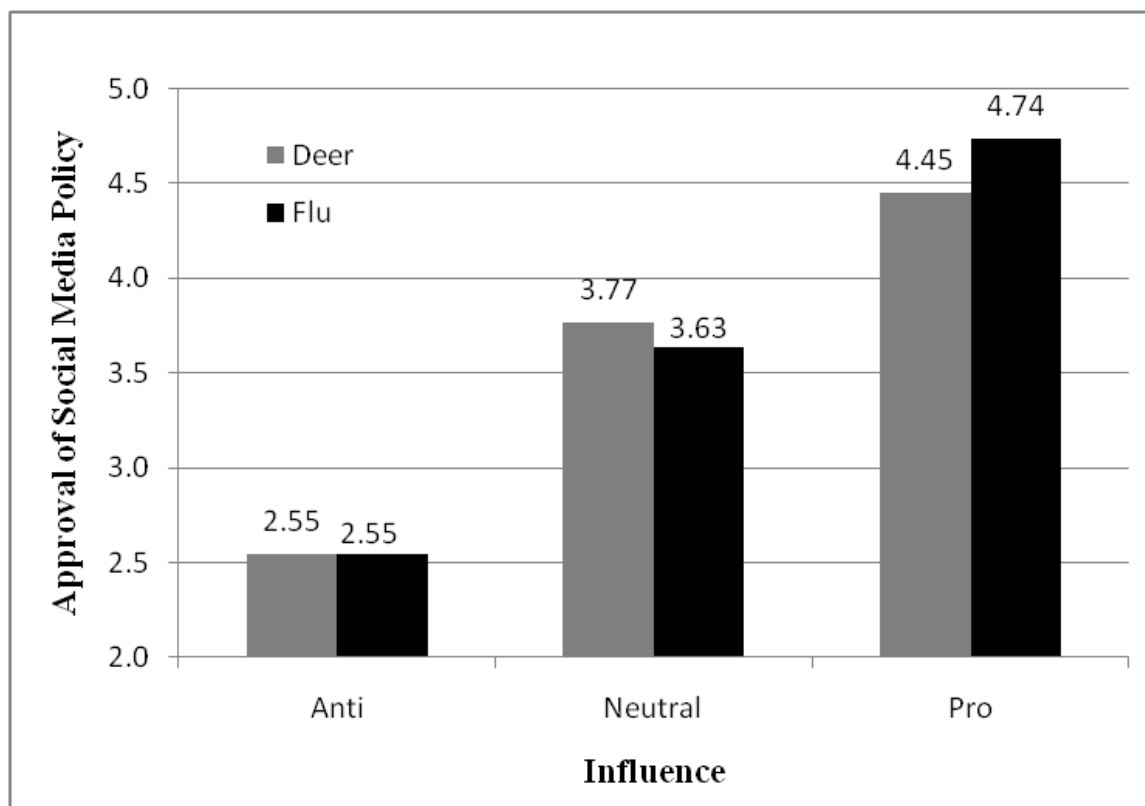


Figure 8. Estimated Marginal Means of Approval of Social Media Policy at 3 levels of Influence and 2 Conditions of Disease Salience ( $n = 215$ ).

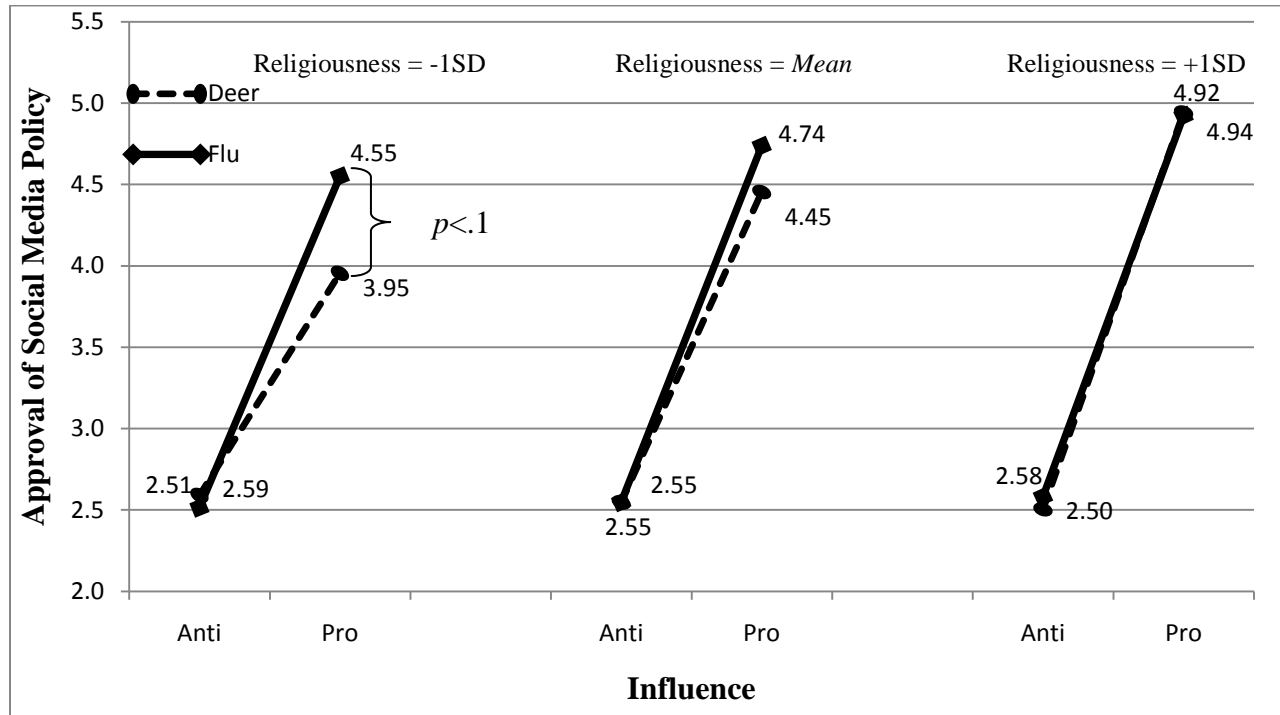


Figure 9. Effects of Disease-salience and Influence on the Approval of Social Media Policy at different levels of valuing Religiousness ( $n = 215$ ).

## **Appendix A**

### Supplementary Tables and Figures

Table A1

*The multiple-mediation Model of Effects of Disease-salience on Approval of Sexual Assault Policy Collapsed across All Conditions of Influence in Study 2 (n = 242).*

Effect	Ashamed		Proud		Disgusted		Approval of Sexual Assault Policy		Approval (Indirect)	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Disease Salience	.16	.01	-.07	.26	.09	.16	.08	.22	.00	.80
Feminist Ideology							.28	.16		
Disease Salience X Feminist Ideology							.04	.86		
Ashamed							.11	.15		
Proud							.06	.34		
Disgusted							-.12	.11		

$\chi^2(28, N=217)=36.59, p = .128, CFI=.99, TLI=.98, RMSEA=.025; R^2=.121, p=.04$



Table A2

*The multiple-mediation Model of Effects of Disease-salience on Approval of Sexual Assault Policy under Anti Policy - Condition of Influence in Study 2 (n = 82).*

Effect	Ashamed		Proud		Disgusted		Approval of Sexual Assault Policy		Approval (Indirect)	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Disease Salience	.15	.18	-.05	.65	.03	.82	.14	.13	.01	.47
Feminist Ideology							-.18	.55		
Disease Salience X Feminist Ideology							.65	.03		
Ashamed							.13	.20		
Proud							.11	.28		
Disgusted							-.06	.55		

$\chi^2(28, N=217)=36.59, p = .128, CFI=.99, TLI=.98, RMSEA=.025; R^2=.276, p=.05$

Table A3

*The multiple-mediation Model of Effects of Disease Salience on Approval of Sexual Assault Policy under Neutral Condition of Influence in Study 2 (n = 82).*

Effect	Ashamed		Proud		Disgusted		Approval of Sexual Assault Policy		Approval (Indirect)	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Disease Salience	.10	.39	-.16	.15	.05	.63	-.05	.66	.02	.59
Feminist Ideology							.36	.32		
Disease Salience X Feminist Ideology							-.06	.86		
Ashamed							.17	.34		
Proud							-.19	.08		
Disgusted							-.39	.03		

$\chi^2(28, N=217)=36.59, p = .128, CFI=.99, TLI=.98, RMSEA=.025; R^2=.177, p=.19$

Table A4

*The multiple-mediation Model of Effects of Disease-salience on Approval of Sexual Assault Policy under Pro- Policy Condition of Influence in Study 2 (n = 78).*

Effect	Ashamed		Proud		Disgusted		Approval of Sexual Assault Policy		Approval (Indirect)	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Disease Salience	.23	.04	-.05	.67	.20	.07	.06	.57	-.01	.56
Feminist Ideology							.61	.09		
Disease Salience X Feminist Ideology							-.32	.37		
Ashamed							.12	.34		
Proud							.13	.22		
Disgusted							-.17	.18		

$\chi^2(28, N=217)=36.59, p = .128, CFI=.99, TLI=.98, RMSEA=.025; R^2=.147, p=.15$

Table A5

*The multiple-mediation Model of Effects of Disease-salience on Approval of Free Speech Policy Collapsed across All Conditions of Influence in Study 3 (n = 213).*

Effect	Ashamed		Proud		Disgusted		Approval		Approval (Indirect)	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Disease Salience	-.01	.95	.06	.37	.14	.04	.04	.56	-.01	.72
Religiousness	-.26	.25	.18	.42	.09	.68	-.02	.92	.03	.44
Disease Salience X Religiousness	.22	.32	-.08	.71	-.06	.80	.17	.44	-.02	.59
Ashamed							-.08	.25		
Proud							.08	.23		
Disgusted							-.08	.29		

$\chi^2(8, N=213)=3.272, p = .916, CFI=1.00, TLI=1.01, RMSEA=.00, R^2=.05, p>.05$

Table A6

*The multiple-mediation Model of Effects of Disease-salience on Approval of Free Speech Policy under Anti-Policy Condition of Influence in Study 3 (n = 69).*

Effect	Ashamed		Proud		Disgusted		Approval		Approval (Indirect)	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Disease Salience	.09	.46	.06	.63	.19	.11	-.07	.59	.02	.70
Religiousness	-.41	.27	.20	.60	.22	.56	-.17	.65	.13	.18
Disease Salience X Religiousness	.32	.39	-.15	.70	-.16	.66	.08	.83	-.10	.22
Ashamed							-.15	.22		
Proud							.18	.15		
Disgusted							.13	.31		

$\chi^2(8, N=69)=3.272, p = .916, CFI=1.00, TLI=1.01, RMSEA=.00, R^2=.05, p>.05$

Table A7

*The multiple-mediation Model of Effects of Disease-salience on Approval of Free Speech Policy under Neutral Condition of Influence in Study 3 (n = 71).*

Effect	Ashamed		Proud		Disgusted		Approval		Approval (Indirect)	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Disease Salience	.04	.72	.11	.36	.17	.14	-.06	.60	.01	.71
Religiousness	.11	.79	-.06	.87	-.23	.54	-.77	.04	.01	.89
Disease Salience X Religiousness	.01	.98	.17	.67	.38	.32	.95	.01	.01	.78
Ashamed							.07	.53		
Proud							.11	.35		
Disgusted							-.03	.83		

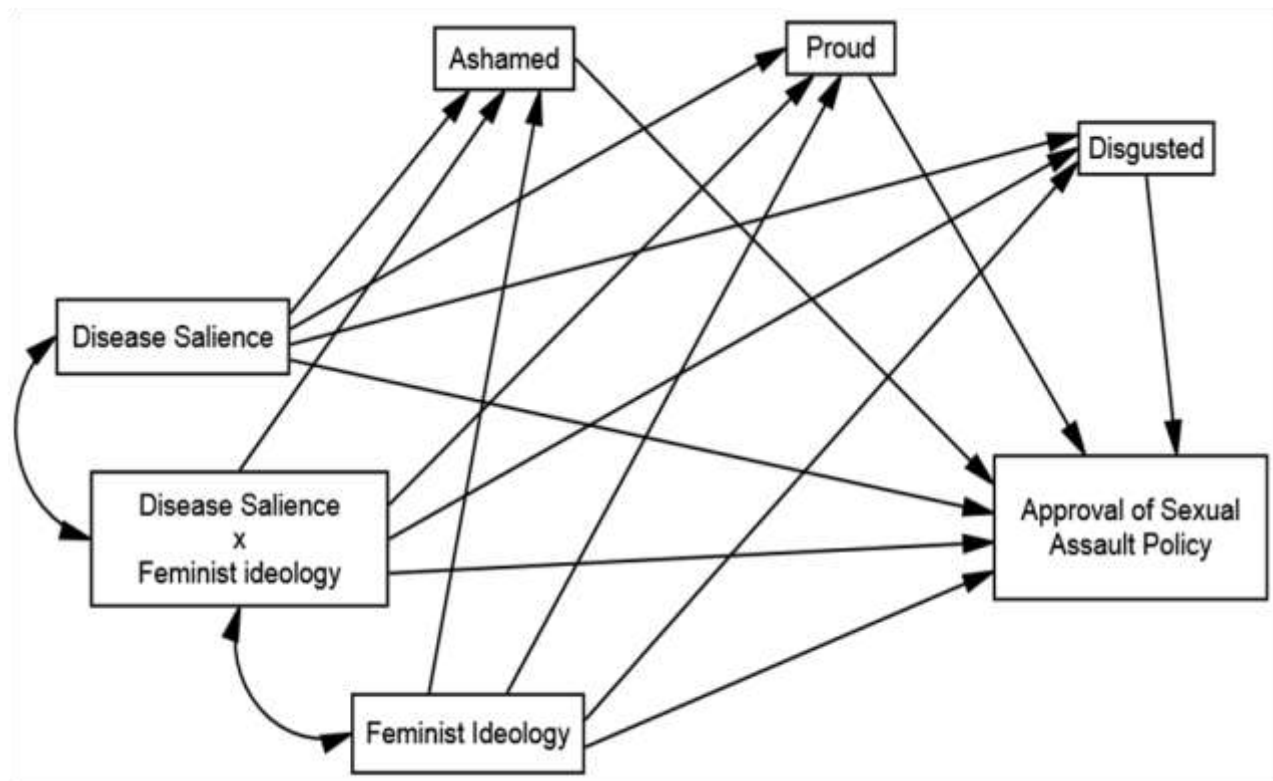
$\chi^2(8, N=71)=3.272, p = .916, CFI=1.00, TLI=1.01, RMSEA=.00, R^2=.13, p>.05$

Table A8

*The multiple-mediation Model of Effects of Disease-salience on Approval of Free Speech Policy under Pro-Policy Condition of Influence in Study 3 (n = 217).*

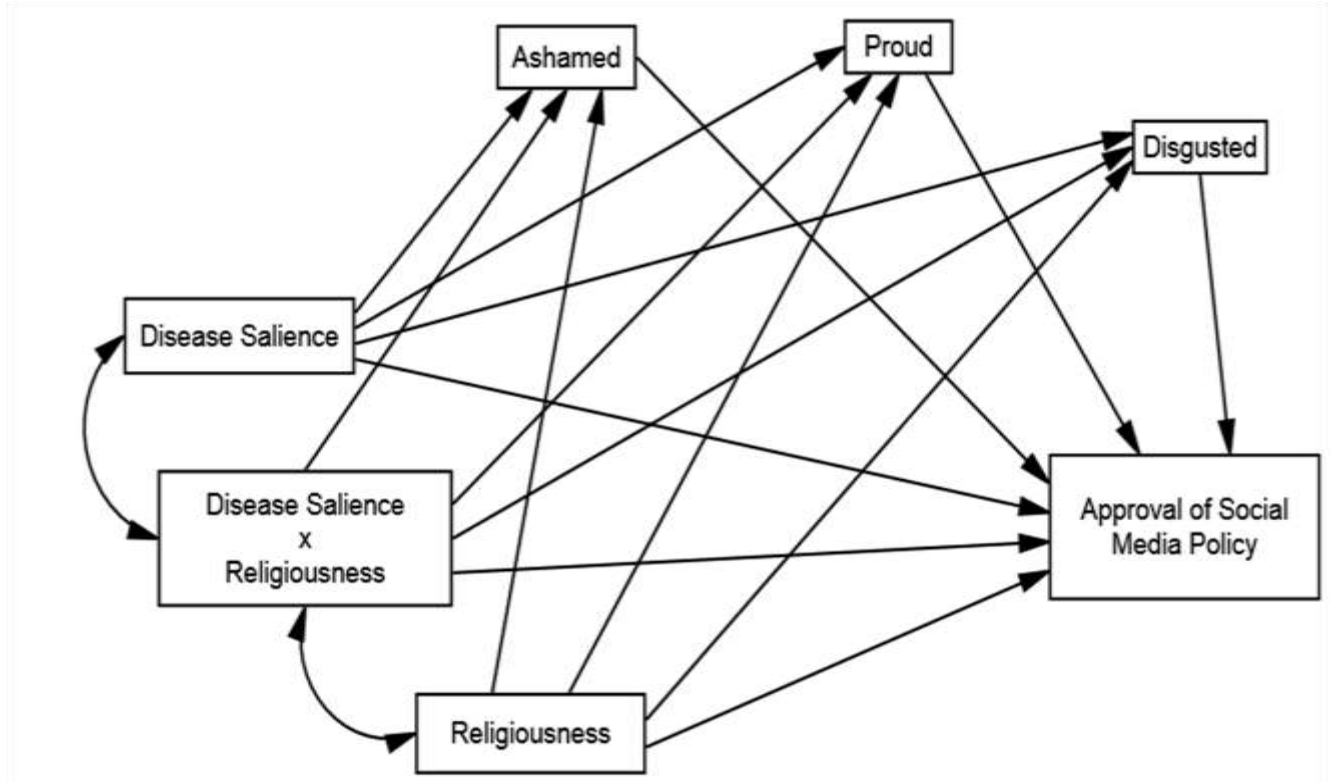
Effect	Ashamed		Proud		Disgusted		Approval		Approval (Indirect)	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Disease Salience	-.11	.34	.03	.83	.14	.22	.10	.40	.03	.45
Religiousness	-.37	.33	.38	.31	.34	.35	.51	.17	.13	.23
Disease Salience X Religiousness	.27	.47	-.21	.57	-.56	.13	-.28	.44	-.12	.33
Ashamed							-.06	.60		
Proud							.19	.09		
Disgusted							.10	.39		

$\chi^2(8, N=73)=3.272, p = .916, CFI=1.00, TLI=1.01, RMSEA=.00, R^2=.14, p>.05$



*Figure A1.* Multi-mediator path model in tested in Study 2 to predict Approval of Sexual Assault Policy from Disease Salience, and Feminist Ideology with Disgust, Shame, and Pride as mediators split across 3 levels of Influence ( $n=242$ ).





*Figure A2.* Multi-mediator path model in tested in Study 3 to predict Approval from Disease Salience, and Religiousness with Disgust, Shame, and Pride as mediators split across 3 levels of Influence (n=215).

**Appendix B**  
**Materials Used in Study 1**

## **Appendix B1**

### **Perceived Vulnerability to Disease Scale**

Please indicate the degree of agreement of each statement by choosing a number between 1 (= Strongly Disagree) and 7 (= Strongly Agree).

1. In general, I am very susceptible to colds, flu and other infectious diseases.
2. I am unlikely to catch a cold, flu or other illness, even if it is 'going around'.
3. If an illness is 'going around', I will get it.
4. My immune system protects me from most illnesses that other people get.
5. I am more likely than the people around me to catch an infectious disease.
6. My past experiences make me believe I am not likely to get sick even when my friends are
7. I have a history of susceptibility to infectious disease.
8. I prefer to wash my hands pretty soon after shaking someone's hand.
9. I avoid using public telephones because of the risk that I may catch something from the previous user. (Item
10. I do not like to write with a pencil someone else has obviously chewed on.
11. I dislike wearing used clothes because you do not know what the last person who wore it was like.
12. I am comfortable sharing a water bottle with a friend.
13. It really bothers me when people sneeze without covering their mouths.
14. It does not make me anxious to be around sick people.
15. My hands do not feel dirty after touching money.

## Appendix B2

### Disgust Sensitivity Scale

**Please indicate how much you agree with each of the following statements, or how true it is about you. Please write a number (0-4) to indicate your answer:**

**0** = Strongly disagree (very untrue about me)

**1** = Mildly disagree (somewhat untrue about me)

**2** = Neither agree nor disagree

**3** = Mildly agree (somewhat true about me)

**4** = Strongly agree (very true about me)

1. I might be willing to try eating monkey meat, under some circumstances.
2. It would bother me to be in a science class, and to see a human hand preserved in a jar.
3. It bothers me to hear someone clear a throat full of mucous.
4. I never let any part of my body touch the toilet seat in public restrooms.
5. I would go out of my way to avoid walking through a graveyard.
6. Seeing a cockroach in someone else's house doesn't bother me.
7. It would bother me tremendously to touch a dead body.
8. If I see someone vomit, it makes me sick to my stomach.
9. I probably would not go to my favorite restaurant if I found out that the cook had a cold.
10. It would not upset me at all to watch a person with a glass eye take the eye out of the socket.
11. It would bother me to see a rat run across my path in a park.
12. I would rather eat a piece of fruit than a piece of paper
13. Even if I was hungry, I would not drink a bowl of my favorite soup if it had been stirred by a used but thoroughly washed flyswatter.

14. It would bother me to sleep in a nice hotel room if I knew that a man had died of a heart attack in that room the night before.

**How disgusting would you find each of the following experiences? Please write a number (0-4) to indicate your answer:**

**0** = Not disgusting at all

**1** = Slightly disgusting

**2** = Moderately disgusting

**3** = Very disgusting

**4** = Extremely disgusting

15. You see maggots on a piece of meat in an outdoor garbage pail.

16. You see a person eating an apple with a knife and fork

17. While you are walking through a tunnel under a railroad track, you smell urine.

18. You take a sip of soda, and then realize that you drank from the glass that an acquaintance of yours had been drinking from.

19. Your friend's pet cat dies, and you have to pick up the dead body with your bare hands.

20. You see someone put ketchup on vanilla ice cream, and eat it.

21. You see a man with his intestines exposed after an accident.

22. You discover that a friend of yours changes underwear only once a week.

23. A friend offers you a piece of chocolate shaped like dog-doo.

24. You accidentally touch the ashes of a person who has been cremated.

25. You are about to drink a glass of milk when you smell that it is spoiled.

26. As part of a sex education class, you are required to inflate a new unlubricated condom, using your mouth.

27. You are walking barefoot on concrete, and you step on an earthworm.

### **Appendix B3**

#### **Authentic Pride Scale**

Below are a number of words and phrases that describe different feelings and emotions. Read each item and then indicate the extent to which you generally feel this way (i.e., how you feel on the average) using the scale shown below:

<b>1</b>	_____	<b>2</b>	_____	<b>3</b>	_____	<b>4</b>	_____	<b>5</b>
Not at All		Somewhat		Moderately		Very Much		Extremely

1. accomplished
2. like I am achieving
3. confident
4. fulfilled
5. productive
6. like I have self-worth
7. successful

## Appendix B4

### Shame Proneness Scale

Instructions: In this questionnaire you will read about situations that people are likely to encounter in day-to-day life, followed by common reactions to those situations. As you read each scenario, try to imagine yourself in that situation. Then indicate the likelihood that you would react in the way described.

1	2	3	4	5	6	7
Very Unlikely	Unlikely		Slightly Unlikely	50% Likely	Slightly Likely	
	Likely	Very Likely				

1. You rip an article out of a journal in the library and take it with you. Your teacher discovers what you did and tells the librarian and your entire class. What is the likelihood that this would make you would feel like a bad person?
2. After making a big mistake on an important project at work in which people were depending on you, your boss criticizes you in front of your coworkers. What is the likelihood that you would feign sickness and leave work?
3. You give a bad presentation at work. Afterwards your boss tells your coworkers it was your fault that your company lost the contract. What is the likelihood that you would feel incompetent?
4. A friend tells you that you boast a great deal. What is the likelihood that you would stop spending time with that friend?
5. Your home is very messy and unexpected guests knock on your door and invite themselves in.



6. You successfully exaggerate your damages in a lawsuit. Months later, your lies are discovered and you are charged with perjury. What is the likelihood that you would think you are a despicable human being?
7. You take office supplies home for personal use and are caught by your boss. What is the likelihood that this would lead you to quit your job?
8. You make a mistake at work and find out a coworker is blamed for the error. Later, your coworker confronts you about your mistake. What is the likelihood that you would feel like a coward?

## Appendix B5

### IPIP Conformity Scale

In this task you will see phrases describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes *you*.

Describe yourself as you generally are now, NOT as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence.

1=Very Inaccurate      2=Moderately Inaccurate      3=Neither Inaccurate nor Accurate

4=Moderately Accurate      5=Very Accurate

1. Worry about what people think of me.
2. Conform to others' opinions.
3. Need the approval of others.
4. Want to amount to something special in others' eyes.
5. Do what others do.
6. Don't care what others think.
7. Am not concerned with making a good impression.
8. Feel it's OK that some people don't like me.
9. Want to form my own opinions.
10. Want to be different from others.

## Appendix B6

### Conformist Values Scale

Please answer the following items using the following scale:

<b>Strongly</b>	<b>Mostly</b>	<b>Somewhat</b>	<b>Somewhat</b>	<b>Mostly</b>	<b>Strongly</b>
<b>disagree</b>	<b>disagree</b>	<b>Disagree</b>	<b>agree</b>	<b>agree</b>	<b>agree</b>

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
----------	----------	----------	----------	----------	----------

1) Obedience and respect for authority are the most important virtues children should learn.

1	2	3	4	5	6
---	---	---	---	---	---

2) People are constantly prying into matters that should remain unquestioned.

1	2	3	4	5	6
---	---	---	---	---	---

3) Too many new ideas in one country can cause its values to erode.

1	2	3	4	5	6
---	---	---	---	---	---

4) Constantly breaking social norms often has harmful, unintended consequences.

1	2	3	4	5	6
---	---	---	---	---	---

5) The most important part of any game is a well-defined set of rules.

1	2	3	4	5	6
---	---	---	---	---	---

6) Imposing tough laws and punishments, even to minor crimes, is an effective way to preserve the fiber of a society.

1	2	3	4	5	6
---	---	---	---	---	---

**Appendix B7****Demographics**

1. What is your age? (in years)
2. I am: Male / Female (choose one)

**Appendix C**  
**Materials Used in Study 2**

## Appendix C1

### Experimental Manipulations

#### Task 1 (Disease Salience)

*Please read the following excerpt (source: [www.cdc.gov](http://www.cdc.gov)) closely and express your candid opinion about it by answering the questions given at the end.*

Influenza (also known as the flu) is a contagious respiratory illness caused by flu viruses. It can cause mild to severe illness, and at times can lead to death.

The flu is different from a cold. The flu usually comes on suddenly.

Most people who get influenza will recover in a few days to less than two weeks, but some people will develop complications (such as pneumonia) as a result of the flu.

Anyone can get the flu (even healthy people), and serious problems related to flu can happen at any age, but some people are at higher risk of developing serious flu-related complications if they get sick.

*Please answer the following questions candidly keeping the above excerpt in mind.*

1. How helpful do you find the provided in the above excerpt? (1 = not at all helpful, 5 = extremely helpful)
2. In certain cases, flu can cause result in more serious ailments. True/False
3. Recall the last time you came into contact with a person who was clearly exhibiting the symptoms of the flu. Please describe how you felt in that person's presence (your comfort level in interacting with them, your thoughts and feelings etc.).
4. Recall the last time you had flu. Which of the following symptoms did you experience?
  - a. Fever or feeling feverish/chills

- b. Cough
- c. Sore throat
- d. Runny or stuffy nose
- e. Muscle or body aches
- f. Headaches
- g. Fatigue (tiredness)
- h. Vomiting and diarrhea.

**Task 1 (Deer)**

*Please read the following excerpt (source: [kdwpt.state.ks.us](http://kdwpt.state.ks.us)) closely and answer the questions given at the end.*

Whitetail [deer] are stately, graceful animals characterized by long legs, pointed hooves, reddish-brown (in summer) to grayish-brown (in winter) coat, a relatively long tail that is brown above but white underneath (hence the name "whitetail"), white undersides, and the presence of antlers during part of the year in males (bucks). Whitetail antlers typically consist of one main beam out of which the tines (normally unbranched) emerge one at a time. Their preferred habitat is that of field and forest edges, woodlands, and wooded banks of rivers and streams.

Except during the summer months, agricultural crops make up 50% to 60% of the whitetail deer diet in Kansas. The daily forage intake for a deer is about 3% of its live weight. Whitetails are polygamous with the males wandering extensively in pursuit of does in heat. Typically, a mature buck may breed with many does during the rut. In Kansas, 50% of all whitetail doe fawns breed before they're a year old. About 95% of the whitetail does breed as yearlings. Healthy females frequently have twins, and triplets are not uncommon.



*Please answer the following questions keeping the above excerpt in mind.*

1. Whitetail deer have long tails that are pure white. True/False?
2. Whitetail deer's prefer to live in the deep forest. True/False?
3. Whitetails are polygamous animals. True/False?
4. Have you ever seen a live whitetail? If so, please describe its appearance in your own words based on your experience.
5. Have you seen another deer species? If so, please describe how that species was different from the description of whitetail provided in the excerpt.

## **Task 2** (*sexual assault*)

The University of Kansas is under federal investigation in response to a complaint filed by a student who had reported she was raped as a freshman in October 2013. Following a university investigation, the accused student was punished with probation, a ban on student housing and a so-called reflection paper. The school decided against adding community service for it would be "strictly punitive."

After the *HuffPost* report, KU students—using a play on the KU slogan, "A great place to be"—unleashed a hail of angry tweets under the hash tag [#aGreatPlaceToBeUnsafe](#). Several student organizations have been taking part in condemning KU's handling the issue and for being too soft on the accused, and treating sexual assault as something less than a crime. The KU Chancellor responded to these demands promising to review the KU policy on sexual assault, provide a speedier resolution of the charge, and to improve the training of staff members on panels of inquiry.

Several other student groups are criticizing the policy proposals. They say that it is important to protect the due process rights of the accused. They have argued that anyone accused of sexual assault must have a fair opportunity to a proper defense, guaranteed by the Bill of Rights of the U.S. Constitution. The opponents of this new policy argue that investigations of such crimes should be carried out by law enforcement, who are less concerned about protecting KU's image. These objectors have been posting online, distributing pamphlets around Lawrence, and chalking the KU campus to get their message out.

There is a lot of debate taking place on this topic, making it a highly controversial issue on KU campus.

*Please respond to each of the following statements honestly keeping the excerpt you just read in mind (1 = strongly disagree, 5 = strongly agree)*

Anti-Policy Condition

Question								
1. KU's sexual assault policy should include stronger punishments.	1	2	1	1	3	2	2	1
2. Although it's important, some students are making too big an issue of this.	5	7	7	7	5	7	6	7
3. We need to have stronger anti-sexual assault policies at KU.	2	1	1	1	4	2	1	1
4. An accused student should not be punished until proven guilty by due process.	7	7	6	7	5	5	7	7
5. KU should be more sympathetic to people reporting an assault; KU's duty is to make sure the accused is punished.	1	1	2	3	1	2	2	1
6. When deciding upon punishment, KU should accommodate the wishes of the victim.	6	6	7	7	7	6	5	7
7. KU should not handle sexual assault cases; they do not have the	2	2	1	1	1	2	3	1

expertise or ability to conduct an investigation of this type of case.								
---	--	--	--	--	--	--	--	--

Note: The numbers shown in the table were presented as "previous participants' responses" to each participant in order to manipulate normative influence. In pro-policy condition, each value represented in this table was subtracted from 8. There were no previous participants' responses in the neutral condition.

## **Appendix C2**

### **Liberal Feminist Attitude and Ideology Scale (Short)**

strongly disagree (1), Disagree (2), disagree slightly (3), agree (4), agree slightly (5), and strongly agree (6)

1. Women should be considered as seriously as men as candidates for the Presidency of the United States.
2. Although women can be good leaders, men make better leaders.
3. A woman should have the same job opportunities as a man.
4. Men should respect women more than they currently do.
5. Many women in the work force are taking jobs away from men who need the jobs more.  
(R)
6. Doctors need to take women's health concerns more seriously.
7. America should pass the Equal Rights Amendment."
8. Women have been treated unfairly on the basis of their gender throughout most of human history.
9. Women are already given equal opportunities with men in all important sectors of their lives. (R)
10. Women in the U.S. are treated as second-class citizens.
11. Women can best overcome discrimination by doing the best that they can at their jobs, not by wasting time with political activity. (R)

## Appendix C3

### Feelings Questionnaire

This questionnaire consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way RIGHT NOW.

Use the following scale to record your answers

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

I feel;

1. proud
2. ashamed
3. disgusted

**Appendix D**  
**Materials Used in Study 3**

## Appendix D1

### Experimental Manipulations

#### Task 1 (*Disease Salience*)



Influenza (also known as the flu) is a contagious respiratory disease that begins in the nose and throat. Flu is caused by a highly contagious virus. Flu spreads from one person to another via exchange of fluids or even breathing the same air.

The influenza infection results in a mild-to-severe illness that can incapacitate a person for up to 14 days and could lead to pneumonia or bronchitis. Flu symptoms are much more severe than those of cold, and may include:

- sudden high fever and headache
- loss of appetite
- severe muscle aches and pain
- extreme fatigue and weakness
- dry cough
- sweating
- sore throat
- nasal congestion
- occasionally nausea, vomiting and diarrhea may occur in children



Anyone can get the flu (even healthy people), and serious problems related to flu can happen at any age, but some people are at higher risk of developing serious flu-related complications if they get sick.

*Please answer the following questions candidly keeping the above excerpt in mind.*



1. How helpful do you find the provided in the above excerpt? (1 = not at all helpful, 5 = extremely helpful)
2. In certain cases, flu can cause result in more serious ailments. True/False
3. Recall the last time you came into contact with a person who was clearly exhibiting the symptoms of the flu. Please describe how you felt in that person's presence (your comfort level in interacting with them, your thoughts and feelings etc.).
4. Recall the last time you had flu. Which of the following symptoms did you experience?
  - a. Fever or feeling feverish/chills
  - b. Cough
  - c. Sore throat
  - d. Runny or stuffy nose
  - e. Muscle or body aches
  - f. Headaches
  - g. Fatigue (tiredness)
  - h. Vomiting and diarrhea.

**Task 2** (*Free Speech*)

The clash between academic freedom and state oversight in Kansas continues, as the state Board of Regents revised its policy on what faculty and staff at the state's colleges and universities can post on social media.

Following harsh criticism of a policy adopted last year that severely restricted social media postings by faculty, the Board added language that is supportive of free speech and academic freedom. But it still allows administrators to suspend and fire faculty members or staffers for social media posts that are "contrary to the best interests of the employer."

The policy has been denounced from many sides, with many critics saying it gave administrators too much latitude to fire or discipline employees for what they said on social media. Among the groups speaking out was the Foundation for Individual Rights in Education (FIRE) who criticized the revised policy for authorizing "punishment for constitutionally protected speech". Similarly, the American Association of University Professors (AAUP) argued that some portions of the policy could lead to professors being fired simply for disagreeing with university policies or their colleagues online.

While national organizations such as AAUP and FIRE are speaking out against the Regents' policy, voices from within the University of Kansas faculty, staff, and student bodies have been relatively ineffective.

**Task 3**

*Please express your opinion regarding each of the following statements (1 = strongly disagree, 7 = strongly agree).*

**Anti-Policy Condition**

Question								
1. Board of Regents has the right to regulate online behavior of its employees.	1	2	1	1	3	2	2	1
2. Regents' social media policy is unfair to the faculty and staff at KU.	5	7	7	7	5	7	6	7
3. KU needs stricter rules to ensure KU employees do not cross the line in the name of "free speech".	2	1	1	1	4	2	1	1
4. KU employees have the right to express their opinions freely, regardless of university policies.	7	7	6	7	5	5	7	7
5. KU Faculty and staff should not say or write anything that might offend others or tarnish the image of the university.	1	1	2	3	1	2	2	1
6. Board of Regents should revise its social media policy while	6	6	7	7	7	6	5	7

taking faculty and staff's concerns into account.								
7. Future revisions of the KU's social media policy should also include provisions to guide online behavior of KU students.	5	6	7	7	7	6	6	7
8. KU's social media policy should NOT affect students because they are not paid by the university.	3	2	1	1	1	2	2	1

Note: Same as Study 2, the numbers above were presented as "previous participants' responses" to manipulate normative influence. In pro-policy condition, each value represented in this table was subtracted from 8. There were no previous participants' responses in the neutral condition.

## Appendix D2

### Feelings Questionnaire

This questionnaire consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way **RIGHT NOW**.

Use the following scale to record your answers

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

I feel;

4. proud

5. ashamed

6. disgusted

7. How likely is it that you might get sick (or catch a germ/virus from another person) in the next few days.

8. When a student is sick, they should stay home instead of putting other at the risk of infection.

1	2	3	4	5
completely disagree	somewhat disagree	Neither agree nor disagree		somewhat agree
extremely				

### **Appendix D3**

#### **Attitude Questions**

In this task, you are asked to Rank each quality given below according to how important you think it would be for children to learn (1 = most important, 7 = least important)

I would like to encourage my children to be:

1. Hardworking,
2. Independent
3. Open-minded
4. Religious
5. Obedient